

REVIEW AND APPROVALS

BENTON LAKE NATIONAL WILDLIFE REFUGE

Great Falls, Montana

ANNUAL NARRATIVE REPORT

Calendar Year 1987

<u>Robert L. Pearson</u>	<u>6/30/88</u>	<u>Bonnie W. Schuch</u>	<u>7/29/88</u>
Refuge Manager	Date	Zone Supervisor Review	Date
<u>Ralph E. Fry</u>		<u>8/1/88</u>	
Regional Office Approval		Date	

ANNUAL NARRATIVE REPORT
Calendar Year 1987

and about a tenth that rate on native grasslands. Botulism, a poisonous toxin producing bacteria, became a serious problem with up to 20,000 birds lost in one year (1970).

In the 1980's new management thrusts began focusing on increasing emergent cover distribution in refuge marshes through the use of an inter-unit pumping system. The four lower units have been operated at a shallower water depth and the accumulating excessive salt load (TDS) gradually flushed into Unit IV to try to

The heart of the refuge water management system is the dam and pumphouse located on Muddy Creek near Power, Montana, some 28 miles west of the refuge. Three 350 horsepower electric pumps elevate water 140 feet through a five mile 48" concrete pipeline over the divide into the Lake Creek Watershed where it then follows a channelized creekbed into Benton Lake. The pumping station has supplied about 7,000 acre feet annually to maintain refuge marshes at an average cost of \$40,000 to \$50,000.

Nesting islands and artificial nesting structures, such as round straw bales, have been used in combination with a temporary goose hunting season closure to stimulate local production of Canada geese. Botulism hazards have been reduced by developing complete drainage capability on each unit by ditching. Cleanup operations have also helped to keep losses under 2,000 per year in recent years. Water surface acres have been reduced somewhat to help offset the deficit in nesting cover and to help reduce energy costs.

Benton Lake is now one of the most productive waterfowl refuges in the United States. Annual duck production has exceeded 39,000 but averages closer to 20,000. Canada goose production has reached 312 and is increasing.

Of some 378 bird species known to visit Montana, 197 have been recorded at Benton Lake and new ones are observed each year and added to the bird list. Other migratory birds that reproduce here by the thousands include Franklin's gull, eared grebe and the American coot. Upland game birds such as gray partridge and ring-necked pheasant have responded well to the improvements in upland food and cover.

The refuge also serves as an important migration stopover. During the spring and fall migrations, up to 100,000 ducks, 6,000 tundra swans and 2,000 Canada geese use refuge marshes. Use by the endangered bald eagle and peregrine falcon has increased in recent years.

The marshes are too shallow to support a fish population. Twenty different species of mammals occur. White-tailed jackrabbit and the long-tailed weasel are frequently seen in the winter, while Richardson's ground squirrels, yellow-bellied marmot and the muskrat are often seen by summer visitors. Both species of deer and the pronghorn are seen in low numbers on the refuge.

Public use is limited to day use from March through November of each year. The local school system uses the refuge for well organized environmental education field trips in May studying plants, birds and insect life. A hunting program is conducted on part of the refuge in October and November for waterfowl and a limited harvest of upland game birds. Most of our visitors enjoy observing or photographing wildlife from the nine mile auto tour route. There are no facilities on the refuge for picnicking or camping.

INTRODUCTION

TABLE OF CONTENTS

Page

A. HIGHLIGHTS

1

B. CLIMATIC CONDITIONS

2

C. LAND ACQUISITION

1. Fee Title	Nothing to Report
2. Easements	Nothing to Report
3. Other	Nothing to Report

D. PLANNING

1. Master Plan	Nothing to Report
2. Management Plan3
3. Public Participation4
4. Compliance with Environmental and Cultural Resource Mandates4
5. Research and Investigations5
6. Other	Nothing to Report

E. ADMINISTRATION

1. Personnel	14
2. Youth Programs	17
3. Other Manpower Programs	Nothing to Report
4. Volunteer Programs	17
5. Funding	18
6. Safety	19
7. Technical Assistance	Nothing to Report
8. Other	Nothing to Report

F. HABITAT MANAGEMENT

1. General	Nothing to Report
2. Wetlands	20
3. Forests	Nothing to Report
4. Croplands	Nothing to Report
5. Grasslands	26
6. Other Habitats	Nothing to Report
7. Grazing	Nothing to Report
8. Haying	Nothing to Report
9. Fire Management	27
10. Pest Control	28
11. Water Rights	Nothing to Report
12. Wilderness and Special Areas	Nothing to Report
13. WPA Easement Monitoring	Nothing to Report

G. WILDLIFE

1. Wildlife Diversity	28
2. Endangered and/or Threatened Species	28
3. Waterfowl	29
4. Marsh and Water Birds	35
5. Shorebirds, Gulls, Terns, and Allied Species	36
6. Raptors	37
7. Other Migratory Birds	37
8. Game Mammals	37
9. Marine Mammals	Nothing to Report
10. Other Resident Wildlife	38
11. Fisheries Resources	Nothing to Report
12. Wildlife Propagation and Stocking	Nothing to Report
13. Surplus Animal Disposal	Nothing to Report
14. Scientific Collections	Nothing to Report
15. Animal Control	38
16. Marking and Banding	39
17. Disease Prevention and Control	41

H. PUBLIC USE

1. General	42
2. Outdoor Classrooms - Students	43
3. Outdoor Classrooms - Teachers	Nothing to Report
4. Interpretive Foot Trails	Nothing to Report
5. Interpretive Tour Routes	44
6. Interpretive Exhibits/Demonstrations	Nothing to Report
7. Other Interpretive Programs	Nothing to Report
8. Hunting	45
9. Fishing	Nothing to Report
10. Trapping	Nothing to Report
11. Wildlife Observations	Nothing to Report
12. Other Wildlife Oriented Recreation	Nothing to Report
13. Camping	Nothing to Report
14. Picnicking	Nothing to Report
15. Off-Road Vehicling	Nothing to Report
16. Other Non-Wildlife Oriented Recreation	Nothing to Report
17. Law Enforcement	48
18. Cooperating Associations	Nothing to Report
19. Concessions	Nothing to Report

I. EQUIPMENT AND FACILITIES

1. New Construction	48
2. Rehabilitation	49
3. Major Maintenance	50
4. Equipment Utilization and Replacement	52
5. Communications Systems	53
6. Computer Systems	54
7. Energy Conservation	Nothing to Report
8. Other	Nothing to Report

J. OTHER

1. Cooperative Programs	Nothing to Report
2. Other Economic Uses	Nothing to Report
3. Items of Interest	54
4. Credits	54

K. FEEDBACK

55

L. INFORMATION PACKET (inside back cover)

A. HIGHLIGHTS

Nesting surveys in May and June found 622 duck nests, down 10% from last year. Nesting success at a rate of 74% Mayfield meant duckling production remained high at 19,780 ducklings. (G.3)

The Ducks Unlimited project in Unit IVB was formally dedicated in a ceremony featuring dignitaries from Region 6, Ducks Unlimited and Anheuser-Busch. (H.1)

The Outdoor Recreation Program at Malmstrom Air Force Base gave our duck banding program a boost by supplying refuge volunteers. Staff and volunteers banded 2,318 ducks. (G.16)

The refuge waterfowl hunting season was successful in terms of hunter success and compliance with major changes in the hunting program. (H.8 & D.2)

An added staff position was allocated to help with the Wetland Management District workload. Gary Sullivan transferred from Quivera NWR into this position in February. (E.1)

Results from several studies confirmed the presence of selenium in sediment, water and biota at levels known to induce reproductive problems in waterfowl. (D.5)

Sightings of neck-collared swans and snow geese provided interesting information on migration patterns. (G.3)

B. CLIMATIC CONDITIONS

Nineteen eighty-seven was the third warmest year on record since 1893 in the Great Falls area.

January and February were both warmer and drier than normal. Temperatures in January averaged 33 degrees, 14 degrees higher than the average. It was also one of the driest recorded with only one inch of snow received. February registered three days below the freezing mark with only 1.8 inches of snow recorded.

March came in like a lamb with record high temperatures, including 74 degrees on the 6th. The month ended with snow storms and much needed precipitation.

April was another warm month with below average precipitation. May continued the warm weather trend with a high of 88 on the 9th. Precipitation returned to normal and refuge marsh units began to look more inviting to nesting waterfowl. June brought warmer and drier weather. The high temperature for the year was set on June 14th at 98 degrees.

July and August reversed the trend and cooler temperatures and much needed precipitation were received. August had the dubious record of being the coldest on record for the Great Falls area. September provided good fall weather with near normal temperatures and precipitation.



A double rainbow appeared after a light August shower.
87-11-35 08/06/87 RLP

October continued the trend of mostly warm very dry weather. November and December were both warm and dry with record high temperatures set in December. The year ended with the coldest day recorded on December 31st of 11 degrees below zero.

TABLE I

WEATHER TABLE - 1987

	<u>G R E A T F A L L S</u>				<u>R E F U G E</u>
	<u>Temperature (F)</u>		<u>Precipitation</u>		<u>Precipitation</u>
	<u>High</u>	<u>Low</u>	<u>Total</u>	<u>Depart</u>	<u>Total</u>
January	61	- 8	.05	- .95	.03
February	63	- 4	.24	- .51	.13
March	74	18	1.81	.88	1.83
April	87	27	.64	- .85	.50
May	88	31	2.63	.11	2.82
June	98	41	1.33	-1.42	1.27
July	97	44	3.05	1.95	2.24
August	93	40	2.43	1.12	1.54
September	87	36	1.30	.27	.86
October	84	20	.02	- .80	.00
November	66	15	.30	- .44	.21
December	62	- 11	.24	- .56	.10
1987	98	-11	14.04	- 1.20	11.52

D. PLANNING

2. Management Plans

Annual plans submitted to the Regional Office included the Burn Plan, Water Management Plan, Hunting Plan Review and Section 7, Pesticide Use Proposal, Fire Dispatch Plan, Written Communication Hazard Plan, and Annual Work Plan. An annual report detailing refuge trapping and predator control was prepared as part of the three year study called for in the Predator Management Plan.

The Refuge Hunting Plan was revised to meet six objectives set by refuge staff and the Regional Office. These objectives included:

1. Reduce the hunt area to less than 40% of the refuge in compliance with the Migratory Bird Conservation Act. This was based on the Field Solicitor's Opinion issued November 6, 1986, that the Executive Order establishing the refuge

intended the refuge to be managed in compliance with the MBCA; although the term "inviolate sanctuary" is not expressly used in the Executive Order withdrawing the public lands. (Previously, up to 80% of the refuge was opened to hunting based on the belief that the refuge was not purchased with MBCA funds.)

2. Stabilize the refuge areas hunted each year to reduce hunter confusion and reduce hunting, information, posting and signing costs. (Previously, hunting units were switched between the six main units based on water levels and management needs.)
3. Separate the hunt area from the tour route. This provides fall tour route use and reduces the possibility of hunter/visitor conflicts thus helping accomplish refuge public use objectives.
4. Follow State seasons to a greater extent thus reducing special refuge regulations and reduce hunter confusion and violations.
5. Evaluate hunt program changes for their effects on fall waterfowl use and endangered species.
6. Establish a steel shot requirement for all refuge hunting including upland game birds.

The Refuge Sign Plan was re-written providing updates on most refuge guide, information, and regulatory signs, and included plans for five seasonal 3'x4' interpretive panels for use at the new visitor kiosk.

3. Public Participation

Changes in the refuge hunting program were coordinated with Montana Fish, Wildlife & Parks and concurrence obtained. We also discussed the changes with the Upper Missouri Breaks Chapter of the Audubon Society.

4. Compliance with Environmental and Cultural Resource Mandates

The refuge Hunting Plan was reviewed for NEPA compliance and the annual Section 7 review.

Manager Pearson served on a study group coordinating a study of bird strikes associated with Western Area Power Administrations' Great Falls to Conrad 230KVA transmission line. Our immediate concern was the high risk area for collisions along the Lake Creek Flat area where our ditch right-of-way and water pumping operations occur. With our input, the final study plan called for a 100-meter transect of approximately six miles along the entire transmission corridor over the Lake Creek Flat to be searched for dead or injured birds (see below).

5. Research and Investigations

a. BIO/WEST Powerline Study - Lake Creek Flat

This study was contracted by WAPA to determine the rate of waterfowl collisions along Lake Creek with the newly constructed 230KVA transmission line. Search transects were conducted by BIO/WEST, Inc. during the autumn of 1987. A total of 23 ducks, 16 shorebirds, two raptors and 69 passerines were collected and identified as mortality due to transmission wire collisions in the first season of study. The majority of ducks and shorebirds found exhibited a moderate to high degree of carrion consumption, while few of the small passerines were touched. Waterfowl comprised approximately 21 percent of all collision mortality, the majority of which were within the vicinity of stock ponds located in Burgmeier's pasture. One kestrel and one short-eared owl carcass was also found. During the study, golden eagles, prairie falcons, and one peregrine falcon were observed using the horizontal arms of the structures as resting and hunting perches. Study results from BIO/WEST's first interim report have been reproduced below from their Table 9 and Figure 2 (next four pages).

b. Interagency Screening Study - Sun River Project

Selenium was first suspected as a contaminant at Benton Lake when an article by Tom Harris in the Sacramento Bee probed the possibility of a widespread selenium problem which had already been linked to wildlife deformities at Kesterson NWR. Of interest, the highest sediment sample analyzed by the newspaper was 7.5 parts per million (ppm) at Benton Lake. Sediment samples taken in November, 1985 revealed even higher levels with a high of 10 ppm selenium. As a result the Department of Interior formed an interagency screening study including the Sun River Project which included the Fairfield Bench, Sun River, Freezeout Lake WMA, Priest Lake and Benton Lake. Seven sites on the refuge were sampled in

Table 9. Summary data for dead bird searches along the Great Falls-Conrad 230 kV transmission line at Lake Creek Flat (Autumn 1987)

DATE	SPECIES/ GROUP	TYPE OF REMAINS	LEVEL OF CARRION CONSUMPTION	TYPE OF INJURY	APPROXIMATE DATE OF DEATH DURING 1987	SPAN LOCATION	DISTANCE FROM CENTERLINE (m)
<u>WATERFOWL</u>							
09/29/87	MALLARD	WING ONLY	HIGH	UNKNOWN	LATE AUGUST	23/1 TO 23/2	15
09/29/87	BUFFLEHEAD	CARCASS	MODERATE	UNKNOWN	LATE AUGUST	20/2 TO 20/3	29
09/29/87	MALLARD	CARCASS	LOW	HEAD TRAUMA	LATE SEPTEMBER	20/5 TO 21/1	26
09/29/87	GADWALL	CARCASS	NONE	BROKEN NECK	LATE SEPTEMBER	21/1 TO 21/2	17
09/29/87	GADWALL	FEATHER SPOT	HIGH	UNKNOWN	LATE SEPTEMBER	21/1 TO 21/2	67
09/29/87	GADWALL	PARTIAL CARCASS	MODERATE	UNKNOWN	MID AUGUST	21/4 TO 21/5	3
09/29/87	G.W. TEAL	PARTIAL CARCASS	MODERATE	UNKNOWN	MID AUGUST	21/5 TO 22/1	18
09/29/87	PINTAIL	FEATHER SPOT	HIGH	UNKNOWN	EARLY AUGUST	20/2 TO 20/3	11
09/29/87	GADWALL	CARCASS	LOW	UNKNOWN	MID AUGUST	21/4 TO 21/5	21
10/04/87	UNK. DUCK	SCATTERED BONES	HIGH	UNKNOWN	EARLY APRIL	20/4 TO 20/5	30
10/04/87	PINTAIL	FEATHER SPOT	HIGH	UNKNOWN	EARLY AUGUST	22/3 TO 22/4	30
10/04/87	UNK. DUCK	FEATHER SPOT	HIGH	UNKNOWN	EARLY AUGUST	21/4 TO 21/5	12
10/04/87	GADWALL	FEATHER SPOT	HIGH	UNKNOWN	EARLY AUGUST	23/4 TO 23/5	37
10/18/87	A. WIDGEON	CARCASS	NONE	NECK TRAUMA	MID OCTOBER	21/4 TO 21/5	0
10/18/87	BUFFLEHEAD	FEATHER SPOT	HIGH	UNKNOWN	EARLY AUGUST	21/4 TO 21/5	10
10/18/87	PINTAIL	FEATHER SPOT	HIGH	UNKNOWN	EARLY OCTOBER	22/5 TO 23/1	10
10/18/87	GADWALL	WING ONLY	HIGH	UNKNOWN	MID JULY	21/4 TO 21/5	15
10/18/87	PINTAIL	FEATHER SPOT	HIGH	UNKNOWN	EARLY OCTOBER	20/2 TO 20/3	6
10/18/87	MALLARD	FEATHER SPOT	HIGH	UNKNOWN	MID OCTOBER	20/5 TO 21/1	8
10/23/87	GADWALL	PARTIAL CARCASS	HIGH	UNKNOWN	LATE SEPTEMBER	23/1 TO 23/2	10
10/23/87	UNK. DUCK	FEATHER SPOT	HIGH	UNKNOWN	LATE SEPTEMBER	23/1 TO 23/2	2
11/11/87	PINTAIL	FEATHER SPOT	HIGH	UNKNOWN	LATE OCTOBER	23/1 TO 23/2	16
11/11/87	GADWALL	FEATHER SPOT	HIGH	UNKNOWN	LATE OCTOBER	23/3 TO 23/4	2
<u>SHOREBIRDS</u>							
09/29/87	UNK. SHOREBIRD	CARCASS	MODERATE	UNKNOWN	EARLY AUGUST	20/3 TO 20/4	0
09/29/87	KILLDEER	CARCASS	NONE	BROKEN NECK	MID SEPTEMBER	21/4 TO 21/5	0
09/29/87	GULL SPP.	CARCASS	LOW	UNKNOWN	MID AUGUST	23/2 TO 23/3	9
09/29/87	GULL SPP.	WING ONLY	HIGH	UNKNOWN	EARLY SEPTEMBER	23/1 TO 23/2	21
10/04/87	AVOET	FEATHER SPOT	HIGH	UNKNOWN	LATE AUGUST	21/4 TO 21/5	5
10/04/87	UNK. SHOREBIRD	CARCASS	HIGH	UNKNOWN	MID SEPTEMBER	21/5 TO 22/1	0
10/04/87	KILLDEER	FEATHER SPOT	HIGH	UNKNOWN	EARLY AUGUST	21/4 TO 21/5	55
10/04/87	M. GODWIT	FEATHER SPOT	HIGH	UNKNOWN	LATE AUGUST	23/1 TO 23/2	0
10/18/87	GULL SPP.	FEATHER SPOT	HIGH	UNKNOWN	EARLY OCTOBER	22/5 TO 23/1	25
10/18/87	GULL SPP.	PARTIAL CARCASS	HIGH	UNKNOWN	MID SEPTEMBER	22/5 TO 23/1	31
11/07/87	GULL SPP.	FEATHER SPOT	HIGH	UNKNOWN	EARLY AUGUST	20/3 TO 20/4	4
11/11/87	GULL SPP.	FEATHER SPOT	HIGH	UNKNOWN	LATE OCTOBER	23/1 TO 23/2	32
11/11/87	L.B. CURLEW	FEATHER SPOT	HIGH	UNKNOWN	LATE OCTOBER	23/2 TO 23/3	30
11/11/87	L.B. DOVITCHER	FEATHER SPOT	HIGH	UNKNOWN	LATE OCTOBER	23/2 TO 23/3	12
11/11/87	L.B. CURLEW	FEATHER SPOT	HIGH	UNKNOWN	LATE OCTOBER	20/2 TO 20/3	22
11/11/87	WILLET	FEATHER SPOT	HIGH	UNKNOWN	EARLY NOVEMBER	22/5 TO 23/1	3
<u>RAPTORS</u>							
09/29/87	A. KESTREL	CARCASS	MODERATE	UNKNOWN	MID AUGUST	20/4 TO 20/5	8
10/18/87	S.E. OWL	CARCASS	NONE	BROKEN NECK	MID OCTOBER	19/4 TO 19/5	6
<u>PASSERINES</u>							
09/29/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE SEPTEMBER	20/3 TO 20/4	23
09/29/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE SEPTEMBER	20/5 TO 21/1	18
09/29/87	HORNED LARK	CARCASS	LOW	UNKNOWN	LATE AUGUST	20/3 TO 20/4	15

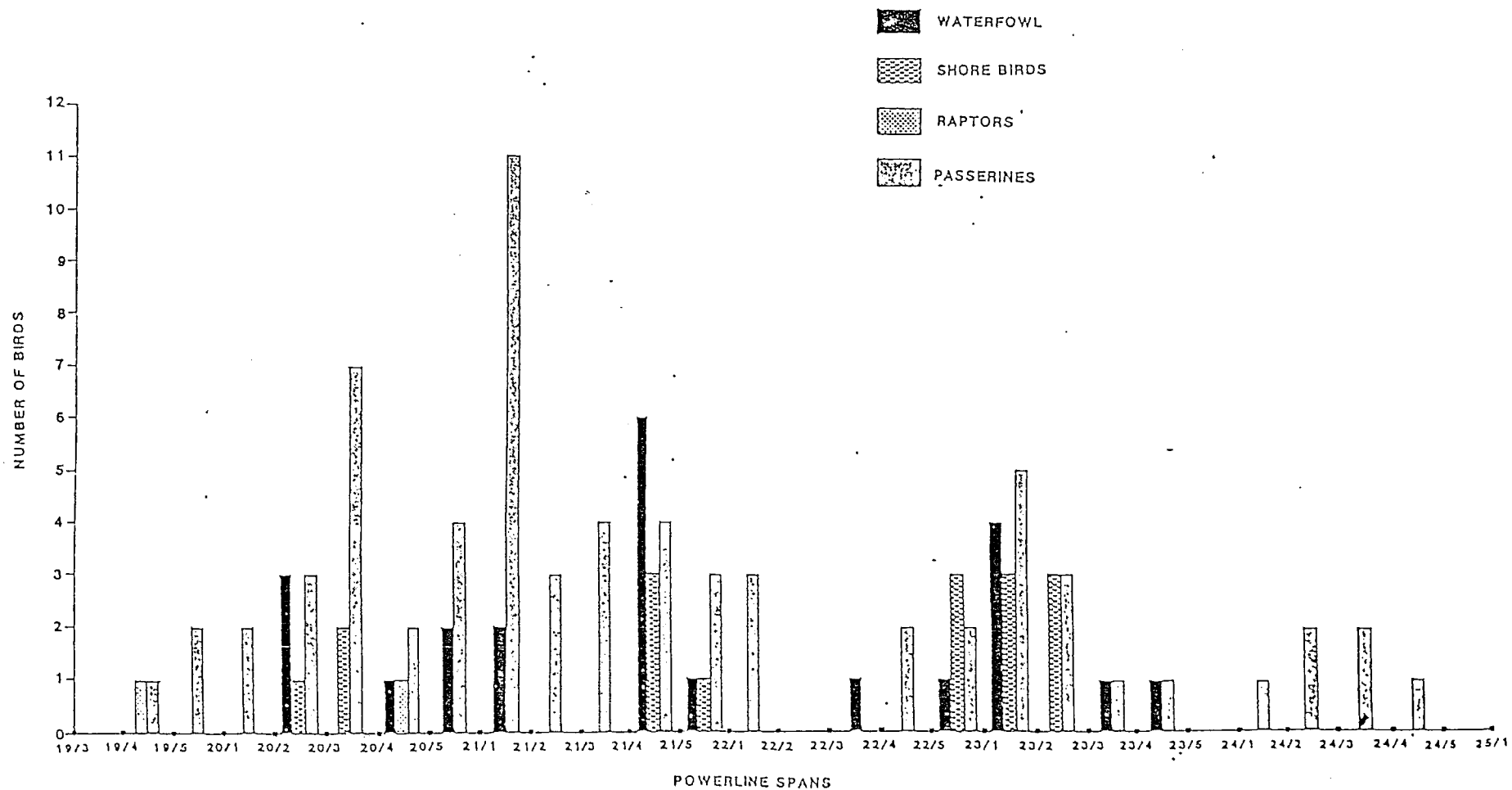
Table 9. Continued

DATE	SPECIES/ GROUP	TYPE OF REMAINS	LEVEL OF CARRION CONSUMPTION	TYPE OF INJURY	APPROXIMATE DATE OF DEATH DURING 1987	SPAN LOCATION	DISTANCE FROM CENTERLINE (m)
PASSERINES (CONT.)							
09/29/87	VESPER SPARROW	CARCASS	NONE	UNKNOWN	LATE JUNE	24/1 TO 24/2	21
09/29/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	MID SEPTEMBER	21/4 TO 21/5	9
09/29/87	D.E. JUNCO	CARCASS	NONE	BROKEN NECK	LATE SEPTEMBER	23/2 TO 23/3	0
09/29/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE SEPTEMBER	24/4 TO 24/5	0
09/29/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE SEPTEMBER	22/4 TO 22/5	11
10/04/30	HORNED LARK	CARCASS	NONE	UNKNOWN	MID SEPTEMBER	21/1 TO 21/2	40
10/04/30	HORNED LARK	CARCASS	NONE	NECK, WING TRAUMA	EARLY OCTOBER	21/5 TO 22/1	6
10/04/30	HORNED LARK	CARCASS	NONE	BROKEN NECK	EARLY OCTOBER	21/1 TO 21/2	4
10/04/30	HORNED LARK	CARCASS	NONE	BROKEN NECK	EARLY OCTOBER	21/1 TO 21/2	40
10/04/30	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE SEPTEMBER	19/4 TO 19/5	6
10/04/30	VESPER SPARROW	INJURED BIRD	NONE	BROKEN WING	EARLY OCTOBER	22/1 TO 22/2	30
10/04/30	VESPER SPARROW		NONE	BROKEN SCAPULAR	EARLY OCTOBER	20/2 TO 20/3	45
10/04/30	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE SEPTEMBER	20/1 TO 20/2	35
10/04/30	HORNED LARK	CARCASS	NONE	BROKEN NECK	EARLY OCTOBER	21/3 TO 21/4	40
10/04/30	L. LONGSPUR	CARCASS	NONE	BROKEN NECK	EARLY OCTOBER	21/1 TO 21/2	4
10/04/30	HORNED LARK	CARCASS	NONE	BROKEN NECK	EARLY OCTOBER	20/5 TO 21/1	1
10/04/30	VESPER SPARROW	WING ONLY	HIGH	UNKNOWN	EARLY AUGUST	20/4 TO 20/5	37
10/18/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	EARLY OCTOBER	21/3 TO 21/4	2
10/18/87	HORNED LARK	CARCASS	NONE	INTERNAL TRAUMA	MID OCTOBER	21/5 TO 22/1	10
10/18/87	PIGDEON	FEATHER SPOT	HIGH	UNKNOWN	EARLY OCTOBER	23/1 TO 23/2	9
10/18/87	HORNED LARK	FEATHER SPOT	HIGH	UNKNOWN	EARLY OCTOBER	23/1 TO 23/2	1
10/18/87	HORNED LARK	CARCASS	NONE	NECK TRAUMA	MID OCTOBER	21/1 TO 21/2	5
10/18/87	HORNED LARK	CARCASS	NONE	HEAD TRAUMA	MID OCTOBER	23/1 TO 23/2	3
10/18/87	STARLING	CARCASS	NONE	BROKEN NECK	MID OCTOBER	21/4 TO 21/5	0
10/18/87	VESPER SPARROW	CARCASS	NONE	BROKEN NECK	MID OCTOBER	23/1 TO 23/2	10
10/18/87	L. LONGSPUR	CARCASS	NONE	BROKEN NECK	MID OCTOBER	20/5 TO 21/1	0
10/18/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	MID OCTOBER	23/2 TO 23/3	3
10/18/87	L. LONGSPUR	CARCASS	NONE	BROKEN NECK	MID OCTOBER	22/1 TO 22/2	2
10/18/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	MID OCTOBER	22/5 TO 23/1	15
10/18/87	L. LONGSPUR	CARCASS	NONE	BROKEN NECK	MID OCTOBER	21/1 TO 21/2	0
10/18/87	HORNED LARK	CARCASS	NONE	BROKEN WING	MID OCTOBER	21/1 TO 21/2	10
10/18/87	VESPER SPARROW	CARCASS	NONE	BROKEN NECK	MID OCTOBER	24/3 TO 24/4	0
10/18/87	HORNED LARK	CARCASS	NONE	NECK TRAUMA	EARLY OCTOBER	21/2 TO 21/3	12
10/18/87	VESPER SPARROW	CARCASS	NONE	BROKEN NECK	EARLY OCTOBER	21/1 TO 21/2	8
10/18/87	HORNED LARK	CARCASS	NONE	BROKEN NECK/SCAPULAR	MID OCTOBER	20/5 TO 21/1	2
10/18/87	VESPER SPARROW	FEATHER SPOT	HIGH	UNKNOWN	EARLY OCTOBER	23/1 TO 23/2	0
10/18/87	HORNED LARK	CARCASS	NONE	NECK TRAUMA	MID OCTOBER	21/1 TO 21/2	3
10/18/87	HORNED LARK	CARCASS	NONE	BROKEN SCAPULAR	MID OCTOBER	20/4 TO 20/5	25
10/18/87	HORNED LARK	PARTIAL CARCASS	HIGH	UNKNOWN	EARLY OCTOBER	20/3 TO 20/4	22
10/18/87	HORNED LARK	PARTIAL CARCASS	HIGH	UNKNOWN	EARLY OCTOBER	21/5 TO 22/1	6
10/18/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	MID OCTOBER	20/2 TO 20/3	0
10/18/87	HORNED LARK	CARCASS	NONE	WING, NECK TRAUMA	MID OCTOBER	23/4 TO 23/5	15
10/18/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	MID OCTOBER	20/1 TO 20/2	3
10/23/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	MID OCTOBER	22/4 TO 22/5	2

Table 9. Continued

DATE	SPECIES/ GROUP	TYPE OF REMAINS	LEVEL OF CARRION CONSUMPTION	TYPE OF INJURY	APPROXIMATE DATE OF DEATH DURING 1987	SPAN LOCATION	DISTANCE FROM CENTERLINE (m)
PASSERINES (CONTINUED)							
10/23/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE OCTOBER	20/3 TO 20/4	0
10/23/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE OCTOBER	20/3 TO 20/4	18
10/23/87	L. LONGSPUR	CARCASS	NONE	THORACIC TRAUMA	LATE OCTOBER	24/2 TO 24/3	1
10/23/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE OCTOBER	23/3 TO 23/4	12
10/23/87	HORNED LARK	FEATHER SPOT	HIGH	UNKNOWN	LATE OCTOBER	20/3 TO 20/4	25
10/23/87	HORNED LARK	CARCASS	MODERATE	BROKEN NECK	LATE OCTOBER	23/2 TO 23/3	15
10/23/87	L. LONGSPUR	CARCASS	NONE	BROKEN NECK	MID OCTOBER	19/5 TO 20/1	6
10/23/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	MID OCTOBER	19/5 TO 20/1	12
10/23/87	L. LONGSPUR	CARCASS	NONE	NECK TRAUMA	MID OCTOBER	21/1 TO 21/2	4
10/23/87	HORNED LARK	CARCASS	NONE	BROKEN BACK	LATE OCTOBER	21/3 TO 21/4	6
10/23/87	L. LONGSPUR	PARTIAL CARCASS	MODERATE	UNKNOWN	MID OCTOBER	22/5 TO 23/1	26
10/23/87	HORNED LARK	CARCASS	NONE	NECK TRAUMA	MID OCTOBER	21/1 TO 21/2	5
10/23/87	HORNED LARK	CARCASS	NONE	NECK TRAUMA	LATE OCTOBER	21/2 TO 21/3	28
10/23/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	MID OCTOBER	21/2 TO 21/3	4
10/23/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	MID OCTOBER	20/3 TO 20/4	23
10/23/87	HORNED LARK	CARCASS	MODERATE	BROKEN NECK	LATE OCTOBER	21/4 TO 21/5	2
10/23/87	HORNED LARK	CARCASS	NONE	BROKEN NECK	LATE OCTOBER	22/1 TO 22/2	8
11/07/87	L. LONGSPUR	CARCASS	NONE	NECK TRAUMA	EARLY NOVEMBER	21/3 TO 21/4	28
11/07/87	L. LONGSPUR	PARTIAL CARCASS	HIGH	UNKNOWN	LATE OCTOBER	24/3 TO 24/4	30
11/07/87	L. LONGSPUR	CARCASS	NONE	THORACIC TRAUMA	EARLY NOVEMBER	21/4 TO 21/5	32
11/11/87	HORNED LARK	PARTIAL CARCASS	MODERATE	NECK TRAUMA	MID NOVEMBER	24/2 TO 24/3	19
11/11/87	L. LONGSPUR	CARCASS	NONE	BROKEN WING ETC.	EARLY NOVEMBER	20/2 TO 20/3	6

Figure 2. Number and location of dead birds recovered along search transects at Lake Creek Flat (Autumn, 1987).



1986 and 1987. Final study results have yet to be published, but several selenium readings, including one avocet egg at 68 ppm selenium, further confirmed the presence of selenium and other contaminants (boron, arsenic) at potentially harmful levels.

The refuge problem is compounded by the various sources of contaminants. First to be suspected is the irrigation return flows from the Greenfields Irrigation Project which are the source of water used to maintain refuge marsh units. Benton Lake is also the lowest point in the 240 square mile Lake Creek watershed and receives salts and transported contaminants from drainage of saline seeps as well as other agricultural runoff. The absence of a drain makes the refuge a closed basin and limits management. The sediment and water samples collected and analyzed by USGS during the DOI study of 1986 seemed to indicate that saline seep discharges into the refuge along the south boundary were possibly a greater source of contaminants (selenium, boron) than the return irrigation flows received from Muddy Creek.

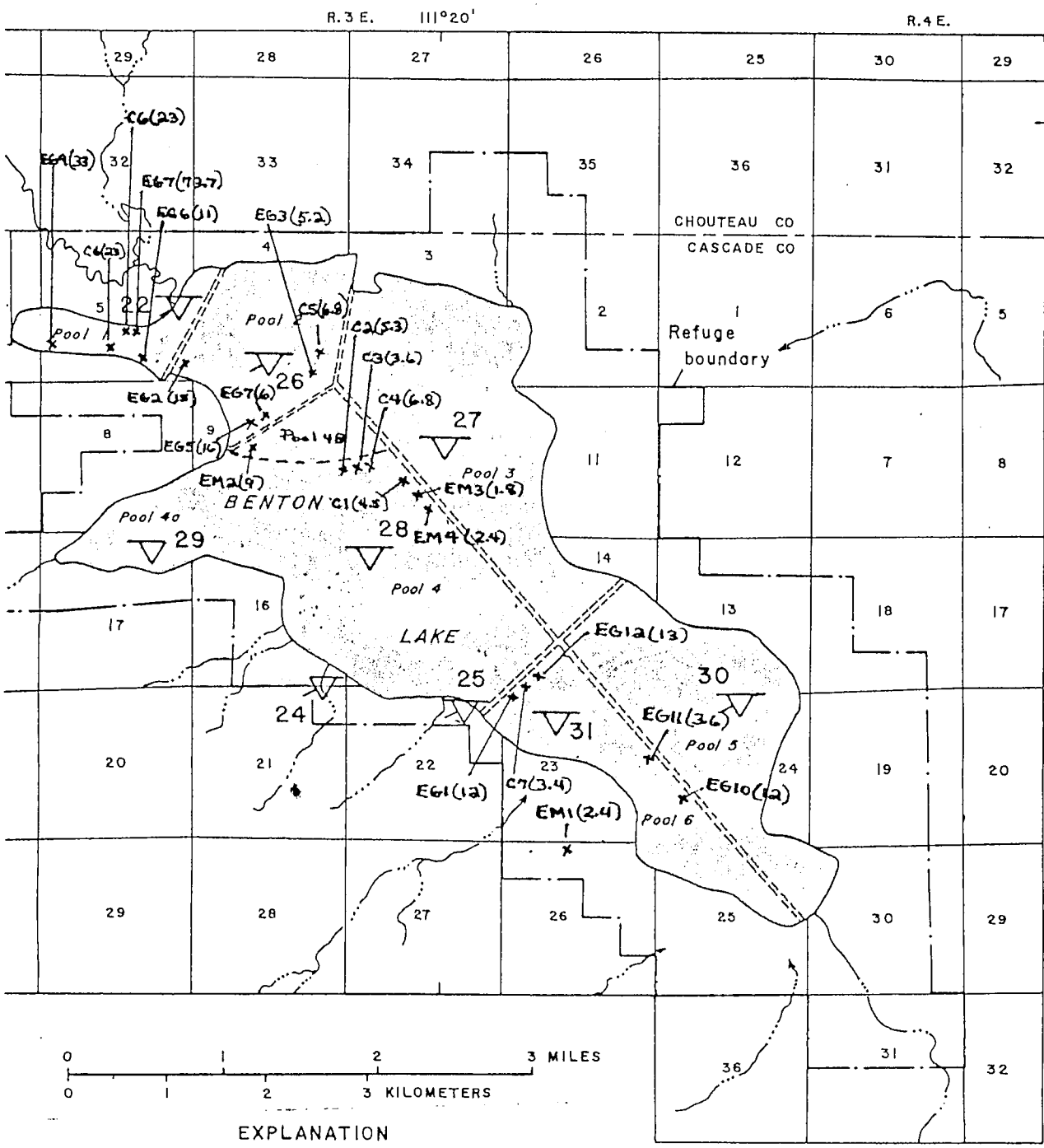
c. Hot Spot Study

RCA biologist Bill Jones headed up this contaminant project which was a further look by Fish and Wildlife Enhancement at suspect areas from the DOI Sun River Project. The original design was to sample suspect WPA's within the wetland management district. A lack of water and birds on the district resulted in a revamping of the study to include sampling from the refuge. Collections were made in the summer of 1987 by contaminant biologist George Allen and refuge staff. Forty samples were analyzed for trace elements and pesticides. Eared grebes were selected because of high selenium readings in grebes collected the year before at nearby Freezeout Lake WMA.

High selenium levels were detected in five liver samples from eared grebes and one American coot. These high selenium concentrations ranged from 15 to 73.7 parts per million dry weight and were all detected in birds from Unit I of the refuge. One grebe was flying around with an additional load of 5.46 ppm of mercury. Elevated selenium levels in these birds are in the range known to cause reproductive problems in waterfowl.

Locations of the 'hot' grebes indicate a high level of selenium in Unit I where the source of water from return irrigation flows pumped at Muddy Creek and Lake Creek runoff (including tile drainage of seep water) enter the refuge. Separating and quantifying the amount of contaminants contributed by these two sources has yet to be done and will be difficult. The following map indicates the locations of collected specimens and resulting selenium levels. The final report is expected out sometime in 1988.

1987 CONTAMINANT COLLECTIONS
BENTON LAKE NWR



- EXPLANATION
- ▽ SURFACE-WATER SAMPLING SITE
 - ▽ BOTTOM-SEDIMENT SAMPLING SITE
 - ▽ BIOLOGICAL SAMPLING SITE
 - 22 SITE NUMBER
- C6(23) Coot #26 (23 ppm Selenium)
EG1(12) Eared Grebe #1 (12 ppm Selenium)
EM2(9) Egg/Embryo #2 (9 ppm Selenium)

d. Refuge Nesting Study

Although selenium concentrations in sediments, water, and biota from some areas of the refuge are high, biological effects from selenium have yet to be documented. In conjunction with the refuge nest drag operations, the refuge crew implemented a study to begin measuring on-the-ground effects of selenium or other contaminants. Out of a set of 496 successful hatching nests, 156 nests (31%) had eggs remaining in the nest bowl. During the July nest dragging checks, 129 eggs remaining in abandoned or successful nests were examined in the field to determine numbers of infertile eggs, dead embryos, and possible deformed embryos. The beaks, eyes, wings, and feet of dead embryos with sufficient growth were inspected for any gross anomalies; but none were found. Out of the 155 nests included in this study, 31 nests (20%) contained dead embryos remaining in the nest and 28 nests (18%) contained infertile eggs. These figures may not be reliable since the time elapsed between nest checks caused many eggs to rot and reduced our ability to accurately determine embryo status in some eggs. In addition, dead embryos could be the result of 1) natural death, 2) the hen leaving her clutch prior to all hatching, 3) other environmentally produced conditions.



Embryos in remaining eggs at the nest site were checked for obvious/gross abnormalities

87-06

06/87

DL

Four embryos were saved in glass jars and submitted with the hot spot study for chemical analysis. A blue-winged teal embryo collected from a nest on the II/IVB dike contained 9 ppm selenium and 1.1 ppm mercury indicating the likelihood of selenium induced embryo mortality. Results from this study was the impetus for the study design for the 1988 season. It will include a more extensive look by the refuge at embryo deaths and/or abnormalities, and more chemical analysis of eggs by FWE's contaminants program.

e. Saline Seep Wells

We continued to monitor four shallow cased wells established on the refuge by the Montana Salinity Control Association for the purpose of monitoring subsurface water tables and determining the extent of the recharge area contributing to the problem. Hydrographs for wells #5 & #7 indicate static water levels since 1980 at or near the ground surface. Well #3 hydrograph indicated the water dropped nearly three inches below the surface in May of 1982, but had returned to the surface by May of 1983 where it has remained. Well #4 also dropped in 1985 but has since risen. These trends simply indicate that the problem with saline seeps on the south boundary of the refuge will not be reversed until we attain management control of upslope recharge areas on adjacent private land (See Feedback, K.).

f. Mallard Brood Survival Study

Cooperative Education graduate student Dennis Orthmeyer completed writing his Master's Thesis on duckling survival in refuge broods of 31 radio-marked hen mallards during the summers of 1985 and 1986. Overall survival for the 60 day pre-fledging period was .39, with 85% of the mortalities occurring within the first 18 days. Total brood loss occurred in 37% of all broods tracked, occurred within the first 24 days post-hatch, and accounted for 60% of all duckling losses. Broods that survived to fledging averaged 5.0 ducklings. Ducklings in broods that hatched early (before June 10) had a 60 day survival probability of 0.44, significantly higher than in late broods (0.33). A significant correlation existed ($r=0.46$, $P=0.03$) between condition index of hens fledging broods and the number of ducklings they fledged. Condition index of hens declined as the season progressed.

[Manager's Comment - Two factors must be kept in mind when evaluating the above study data: 1) it was assumed that all ducklings were lost if their radio-collared hen was observed three times in a row without them; and 2) the human disturbance factor on these specific broods generated by this study was not evaluated.]

E. ADMINISTRATION

1. Personnel



1 6 7 2 5 4 3

PERMANENT PERSONNEL

1. Robert L. Pearson, Refuge Manager - GS-11 - EOD 08/27/77
2. David D. Linehan, Assistant Manager - GS-9 - EOD 09/23/86
3. Gary L. Sullivan, Assistant Manager - GS-7 - EOD 02/01/87
4. Elizabeth A. Benway, Refuge Assistant - GS-5 - EOD 07/28/68
5. Vincent J. Marko, Eng. Equip. Operator - WG-10 - EOD 04/30/62
6. Patrick T. Nies, Maintenance Worker - WG-7 - EOD 09/28/87

TEMPORARY PERSONNEL

7. Jimmie J. Reynolds, Bio Aid - GS-4 - 04/13 - 10/24/87
8. Ronald D. Wynegar, Laborer - WG-2 - 06/23/86 - 04/07/87
9. Tarl W. Norman, YCC Enrollee - 06/08 - 08/14/88
10. John A. Seitz, YCC Enrollee - 06/08 - 08/14/88

Nineteen eighty-seven saw the arrival of a second assistant manager, a first for Benton Lake. Gary L. Sullivan was reassigned from Quivira NWR on February 1st and quickly adjusted to life in the "big city". Gary's primary responsibility will be the Wetland Management District and he has undertaken that job with much enthusiasm.

Following nearly two years of surgery, physical therapy and various medical treatments, it was determined that Maintenceman Scott Foster would not be able to return to his regular duties at Benton Lake. In order to refill his position and get much needed work accomplished at the refuge he was terminated due to disability on August 14th. Scott is presently exploring various types of re-training through the OWCP. We regret losing Scott and wish him well in whatever new vocation he chooses.

Temporary Laborer Ron Wyneger was terminated on April 7th. At that time the paper work was initiated to recruit a full time maintenance worker.

Jimmie J. Reynolds reported for duty on April 17 as a Bio Aid, GS-4. Jimmie assisted in the nest study, banding program, botulism surveillance, supervised the YCC crew and carried out the trapping program. His appointment was terminated on October 24 and he left to take a year appointment at Great Swamp NWR.

Patrick Nies transferred in from the National Park Service to fill the maintenance position vacated by Scott Foster. He reported for duty on September 28. He and his family have purchased and home in Great Falls and are settled in.

Training during the year included:

Pearson and Linehan attended a "Holistic Resource Management in Practice" course in Great Falls in January.

Pearson, Linehan, Benway, Marko and Wynegar attended a Safe Driver course presented by the U. S. Forest Service in Great Falls in February.

In March Pearson, Linehan and Sullivan attended a Law Enforcement refresher in Denver and Linehan and Sullivan attended a law enforcement workshop and pistol qualification at C. M. Russell NWR in August.

In May Linehan completed an eight hour CPR course given by the Red Cross in Great Falls and Pearson, Benway, Sullivan and Reynolds completed a 4 hour CPR refresher at the refuge.

In June Pearson, Linehan and Benway attended a FERS seminar given by the BLM personnel in Great Falls. Their efforts were greatly appreciated as this was the only opportunity refuge personnel had to compare the two retirement programs.

In September Benway started a 60 hour course "Micro Word Processing (WordPerfect)" at the local VoTech Center. The class was presented two evenings a week through November and provided excellent instruction in the use of WordPerfect and the new refuge computer.

In December Pearson, Linehan, Sullivan and Benway began a 60 hour course at the local VoTech entitled "Data Base Management". We are extremely fortunate to have such good training available in our area and have found the instructors at VoTech to be very cooperative and willing to help us with our individual needs at the refuge.

Meetings attended were as follows:

Pearson: Project Leaders meeting - Kalispell
Regional conference - Denver
CMR annual range tour
Wetland tour - Malta area
Annual Work Plan meeting - Plentywood
Tri-County Water District

Linehan: Project Leaders meeting - Kalispell
Business and Computer Seminar - Great Falls
Grazing planning session - Upper Souris NWR, ND
Annual Work Plan meeting - Plentywood

Sullivan: Project Leaders meeting - Kalispell
CMR annual range tour
Annual Work Plan meeting - Plentywood

Benway: Business and Computer Seminar - Great Falls
Administrative Workshop - Denver

TABLE II

PERSONNEL

FY	Full Time	Temporary	YCC	FTE
1987	6	2	2	6.3
1986	6	3	2	6
1985	5	2	2	5.9
1984	5	2	2	5
1983	5	2	2	5

FTE's does not include YCC

2. Youth Programs

Two YCC enrollees were recruited through the school counselors at the two local high schools. Tarl Norman, a student at Great Falls High School and John Seitz, a student at C. M. Russell High School, reported for duty on June 8th.

During their two months at Benton Lake they accomplished many tasks including assisting with the nest survey, buildings and grounds maintenance, litter pickup, vehicle cleanup and numerous small projects.

Their last day was August 14th. We are fortunate to be able to take advantage of the YCC program to accomplish many of the small projects our permanent personnel are too busy to do.



YCC enrollees John Seitz (l) and Tarl Norman (r) assisted in many refuge work projects including duck banding.

87-12-24

08/14/87

DL

4. Volunteer Programs

Five airmen from Malmstrom Air Force Base volunteered their time and effort to assist in the banding program. We appreciate the cooperation of the Health, Morale and Welfare Division at the base in this project.

5. Funding

Fiscal year 1987 program costs were kept within the budgeted allotment. Other than salaries, the largest single item in our budget is the cost of pumping water from our pumping station at Power, Montana, to the refuge. Most of our pumping is accomplished in the last quarter of the fiscal year so it is necessary for us to program about one-third of our annual budget for that period.

Due to ~~any~~ extremely dry winter and spring, our pumping costs were up this year with 19.6% of our O and M budget of \$265,000 going for pumping. Other large expenditures included signs and art work for the proposed wildlife trail and the moving costs to transfer two employees in to the refuge.

In addition to the \$265,000 O & M funds, we had \$27,000 for small ARMM projects, \$15,000 for large ARMM projects and \$40,000 for resource problems. We received \$3,000 for YCC fund and had a total of \$8,780 in quarters maintenance funds.

Table III provides a summary of funding for the past five years.

TABLE III

FUNDING SUMMARY

FY	1210/ 1260	1240	1220/ Rehab	Qtrs Maint.	YCC	TOTAL
87	347,000a			8,780	3,000	358,700
86	355,700b			5,500	3,000	368,200
85	325,000c			3,000	3,000	331,000
84	275,000d		59,400e	3,100	3,000	337,000
83	185,000	22,000	60,000f	1,700	3,000	271,700

a Includes ARMM funds of \$42,000 and Resource Problem funds of \$40,000

b Includes ARMM funds of \$121,000 and Resource Problem funds of \$40,000

c Includes ARMM funds of \$90,000 and Threats & Conflicts funds of \$40,000

d Includes ARMM funds of \$70,000

e Engineering job order carryover from FY 83

f Engineering job order carryover into FY 84

6. Safety

Eight formal safety meetings were held this year and safety is an agenda item on all weekly staff meetings. Safety films viewed this year included "Thermal Wilderness" and "Forklift Safety". Meeting topics included wildfire safety and readiness, fire extinguishers and alarms, radon testing, chemical hazards and spraying, and personal protective clothing and gear. Audiometric testing was completed for all permanent refuge personnel. This "initial" testing was conducted by a Beltone representative and the results added to personnel records. The refuge received three radon test kits from the Region. Both residences had radon levels just above background levels and will need retesting.

Sullivan presented a monthly safety meeting on pesticides and winter travel gear and safety kits. Maintenance Worker Patrick Nies presented a safety meeting on the topic of indoor contaminants such as radon gas. All new employees were given a safety orientation and issued safety gear.

One minor accident requiring medical attention occurred during the year. Assistant Manager Linehan received medical treatment to prevent infection for an eye injury resulting from handling birds during duck banding operations. Evidently, bird droppings and/or pond water splashed into his eye while he was removing birds from the duck banding trap. Medical attention was sought after the eye showed immediate redness and irritation. The ophthalmologist reported the irritation was similar to a chemical burn.

Special emphasis was again placed on safety for the YCC program. The first day and many hours thereafter are spent on safety orientation, job hazard analysis, personal protective gear and equipment safety. The emphasis on safety hopefully pays off as evidenced by another YCC season without injury.

F. HABITAT MANAGEMENT

2. Wetlands

The marsh and water management objectives for Benton Lake as developed in the comprehensive Water Management Plan of 1983 are as follows:

1. Protect the natural and cultural resources.

See Section D,5c regarding the effort to identify water quality problems related to selenium.

2. Support and produce identified refuge output objectives; primarily for waterfowl, marsh and shorebirds by providing a stable cross sectional variety of habitat conditions.

Drought conditions, budget limitations and water supply and pump system design have adversely affected our ability to produce at objective levels this year and it may be worse next year.

Dabbling duck production objectives were exceeded but we are below target levels on diving duck (4000) and Canada goose (500) production. Low water conditions in May and again in the fall adversely affected waterfowl use, but stimulated use by marsh, waterbird and shorebird groups.



Twenty 4'x 4'x 8' square bales were placed in refuge marshes. The square bales were donated by Freezeout Lake WMA.

87-12-16

08/10/87

RLP

3. Maintain and expand emergent cover distribution to 40% of each marsh unit so as to increase their carrying capacity for canvasback and redhead production.

The major change since 1983 is the expansive establishment of alkali bulrush in Units IVc and VI; most of the spikerush in Unit VI has been replaced with alkali bulrush. There has been very little change in hardstem bulrush distribution. Cattail has made steady but slow expansion of the existing stands in Units I and II. New stands of cattail are developing in Unit IVc. Alkali bulrush stands are in an early developmental stage in Units III and V with only a few small clumps of hardstem bulrush in the latter two units. Massive algae blooms continue like a plague on most units, hindering production of submerged aquatics. Sago pondweed production dominates the marshes with water milfoil distribution considerably reduced. Swan use days reflect this improved food production.

4. Avoid/minimize botulism losses.

Planned shallow water management practices, with increasing expanses of emergent vegetation in the marsh units, were thought to increase hazards to waterfowl due to botulism. So far this has not proven to be the case. Known losses have not exceeded 800 since 1980. As many as 20,000 were lost in 1970 at Benton Lake. Preventative practices to minimize the fly maggot cycle and to reduce water surface acres during the mid summer period appear to be paying off. Only 83 carcasses were found and buried this year during botulism surveillance operations.

5. Maintain water salinity levels below 5,000 micromhos by:

- a. Developing drain system to the Missouri River
- b. Sacrificing Black Horse Lake - operate as salt discharge unit
- c. Sacrificing one marsh unit - operate as salt discharge unit
- d. Bureau of Reclamation proposal for a surge relief dam near Power, with discharge system through Benton Lake, Black Horse Lake, then Portage Coulee to the Missouri River

Salinity readings are greatly affected by local conditions and recent hydraulic changes. Most of the marsh habitat at Benton Lake remains below the 5000 micromho level. The primary exception being the borrow pit areas during low water conditions.

All of the corrective options still seem to be available except the surge relief dam near Power, Montana, by the Bureau of Reclamation.

6. Protect and make efficient use of refuge water rights.

With the support of Regional Office personnel we were able to get funding and a contract let to provide a 200 horse power pump unit and some needed modifications to the control system at the Muddy Creek pumping station. This should improve our pumping efficiency and flexibility so we can better adapt operations to changing water supply conditions.

A monitoring system so that changing conditions at this remote pumping station can be transmitted to the refuge headquarters is an ongoing high priority need.

Wetland Habitat Summary

Refuge marsh units started the year with only 2571 acre feet of water on 2761 surface acres. No snow pack resulted in almost no runoff. Units were ice free by the 6th of March. Approximately 150 acre feet of runoff was received in early April from snow melt. A 1.75 inch rain shower generated about 200 acre feet of runoff in mid July. A rainy period in May helped soil moisture conditions but didn't generate runoff. Habitat conditions deteriorated rapidly in April and by mid May only 1328 acre feet were left covering some 1829 surface acres. Pumping from Muddy Creek was operated from May 15 to September 21, providing 7987 acre feet of water to the marsh units. Without pumping, the units would have dried up and little or no duck production would have been realized. The marsh units again steadily lost water through the end of the year with little relief from the drought. Marsh units froze on November 16.

1987 Unit Management

Unit water levels followed the 1987 Water Management Plan except as noted below.

Unit I: Lack of runoff and continued drought conditions resulted in the unit levels declining to one foot below May target levels until pumping began on May 15th. After pumping ceased in September, levels dropped about 6 inches below target levels by the end of the year.

Unit II: Water levels followed the same pattern as in Unit I above but with a little less differential. The planned water level drop during July and August for botulism control wasn't needed and levels were above target during that period.



Unit III was refilled in July flooding the foxtail and further isolating our DU islands.

87-12-07

08/10/87

RLP

Unit III: This unit was dry to start the year and received most of the pumped water during July and August. Levels then declined steadily. This unit supported the major migrational use for two reasons - it was closed to public use and had produced an excellent food crop of sago pondweed. Water dropped below target levels in the fall.

Unit IVa: This unit received only runoff waters, about 60 acre feet, and remained dry most of the year. Planned repair and development work was not undertaken.

Unit IVb: Water levels dropped rapidly in May to 1.2 feet below target until pumping supplies could be diverted. Levels remained below target until July. Due to the formal Ducks Unlimited dedication ceremony on August 6 for this unit, water levels were raised to about 6 inches above target in late July. As in all the other units, fall levels dropped about 6 inches below target. Waterfowl use, both production and migrational, was above expectations on this unit and the visiting dignitaries were well impressed. Spikerush was the main emergent and replacement by alkali bulrush was delayed somewhat due to the higher mid summer water levels routine.



The south DU island in Unit IVb was planted to DNC in 1986 and produced a good initial growth of sweet clover, however....

87-12-27

08/13/87

RLP



A close-up of the same island shows the poor soil conditions and lack of grass or clover seedlings. See successful duck nest.

87-12-29

08/13/87

RLP

Unit IVC: This unit was nearly a foot below planned levels in mid May and again in mid June, then from the first of August on it remained at or near borrow pit levels. The low levels caused the Franklin gull colony of last year to relocate into Unit VI and it supported only small numbers of waterfowl most of the year. Vegetation development continued with both alkali bulrush and cattail making good gains.

Unit V: The hot dry April weather took this unit rapidly down to mud flats with water in the borrow ditches and canals only by mid May. Pumped water supplies from Muddy Creek returned water levels to a peak of 3616.7, about 6 inches above target levels by mid June. After pumping was stopped in September levels steadily declined to 3615.7 or about 6 inches below target. Thus the north shore of the circle dike island was connected with the main shoreline and mud flats were exposed in several areas and the south bay was dry. This unit supports a major portion of our duck production at Benton Lake.

Unit VI: Water levels were kept within 4 to 6 inches of target levels until pumping ended in September. Levels then declined to 3615.5, some 0.7 feet below target levels. Levels were consistently below target levels from mid April on. This unit was selected by the Franklin gulls as their nesting colony site. The relatively low water conditions allowed further expansion of the extensive alkali bulrush stands. We now have a little too much alkali bulrush in this unit and are trying to get cattail to invade and become established. Spikerush has almost been completely replaced by the short bulrush.

Muddy Creek Pumping Station: This major pumping facility is located about 30 miles west of the refuge near Power, Montana. It has three 7500 gpm pumps driven by 350 horsepower electric motors. Our water rights consist of up to 14,000 acre feet of return irrigation flows in Muddy Creek. These waters originate in the Sun River drainage with three irrigation reservoirs and associated canal delivery system managed by the Greenfields Irrigation District. Their schedule usually calls for deliveries starting in early May and shut-down in August.

Below normal snowpack and no local runoff caused us to try to initiate pumping in mid April, but insufficient water was available. In May and June after the district was delivering water to users, the supply at our pumping station was quite variable and often insufficient to keep all three pumps operating. Our pumps were frequently shut down by power failures, storms, or temporary low water supplies. We somewhat adjusted for this by negotiating with the neighbor and immediate down stream (junior water right) water user. We would adjust our pumping when he needed to irrigate his

crop if he would monitor and restart our pumps between our regular servicing visits to the station. This did much to reduce our down time.



Pumping operations at the Muddy Creek pumpsite extended into September.

87-10-18

07/10/87

GLS

A contract was awarded to Allen Electric to provide and install a new 200 horsepower, 3700 gpm pumping unit. This contract included some remodeling of the control panels to reactivate the automatic restarting features following a power failure or low water shut down. This system had been disabled by a former manager. After the pumping season, the No. 3 pump was removed and stored at refuge headquarters. The 200 horsepower unit will be installed next spring after ice out.

System maintenance included replacement of two of the three butterfly valves between the pumps and the main 48 inch pipeline in May. Two gate valves were replaced on the sump pump system. Coils on the time delay relays for the No. 1 and No. 2 pumps were also replaced. Pumping operations were shut down twice to clean the bottom intake screen.

5. Grasslands

The refuge contains 5,773 acres of short-grass prairie dominated by western wheatgrass, green needlegrass and prairie junegrass. Light intensity season long grazing was terminated in 1976 and the grasslands have rested since. Prescribed fire has not been used. Very little new growth

occurred in 1987 and native grass vigor and density appears poor with the forb component nearly absent. Native prairie grasslands comprised 79.4% of refuge habitats but accounted for only 13.7% of all initiated nests found in 1987.



This pintail nest was successful despite poor cover conditions in native grassland. Note one runt egg.
87-03-08 05/05/87 DL

9. Fire Management

A supplement to the annual burn plan was prepared to allow burning of 2 acres of roadside ditch (crested wheatgrass) as part of a road widening project. A permit to burn was obtained from the County and the Black Eagle Fire Department. A half mile of roadside was burned to facilitate the road widening project. We received a 200 gallon Wajax pumper for fire suppression. No prescribed burning was accomplished.

The step test was administered to the refuge fire crew by Registered Nurse Sandy Ellis. Not only did everyone survive, all obtained a passing score. A fire safety session was held at the beginning of the fire season to review the fire management plan, dispatch plans, safety equipment and operation of the pumper. A wildfire was reported during the summer by a neighbor during a lightning storm, but the fire was out by the time staff arrived.

10. Pest Control

Several small areas of spotted knapweed along the Bootlegger Trail and refuge roads and parking lots were treated by hand pulling. Refuge use of chemicals would have been totally eliminated except for patches of knapweed among 60 acres of grassland at the Muddy Creek pumpsite. Teton County Weed Board again supplied chemical (2,4-D, banvel mixture) free of cost, and this year agreed to have the county weed crew spray as much of the Muddy Creek pumpsite as they could get with their equipment. Engineering Equipment Operator Marko and Reynolds returned to spot treat knapweed patches in the more inaccessible areas and along the spoil banks.



Spotted knapweed chemically treated along the SW border of the Muddy Creek tract.

87-10-22

07/22/87

GLS

G. WILDLIFE

1. Wildlife Diversity

Marsh, prairie and DNC habitats on the refuge combine to provide a wildlife diversity in striking contrast to the surrounding lands ravaged by strip-crop agriculture. The high productivity of shallow refuge marshes fuels a system of high species diversity as well as density.

2. Endangered and Threatened Species

Two **bald eagle** sightings were recorded during spring migration while twenty-one were documented during the fall

and early winter. A peak of seven bald eagles, two adults and five immatures, was seen on November 19. Eagles remained on the refuge throughout most of November and were seen frequently adjacent to duck roost holes in the ice. Waterfowl mortalities and cripples provided an ample supply of prey. The last sighting of the year was three adults on December 15 huddled around an ice opening containing the last of the year's hearty mallards.

Peregrine falcons were observed on four occasions during the year. Two birds were seen on May 11 and May 15. An early fall migrant was seen on September 1 and a late migrant was observed on November 20.

3. Waterfowl

Swans

An early pair of tundra swans were first observed on February 18th. A spring peak population of 4,320 was recorded on March 31. The fall population peaked at 3,300 on November 2nd. Mild weather allowed sixty swans to remain on the refuge into the second week of December.

A single neck collared swan was observed on Unit III during the fall but the observer was unable to distinguish the letter-number combination. Two neck collared swans observed at nearby Freezeout Lake WMA, were 2 of 29 swans collared last summer at Selawik NWR in northwestern Alaska. They were banded as a breeding pair with five cygnets. The same birds were seen this winter (1988) in the Chico, California area on January 9, 18, and 27. Evidently, Selawik tundra swans migrate past Fairbanks, AK., Whitehorse, YK., Peace River and Edmonton, ALB., and then south to our area. From there they have a scattering of reports from Cascade, MT., Tremonton, UT., and Camas, ID. The main body of winter sightings are from the Central Valley of California, between Stockton and Sacramento.

White Geese

Snow geese were first observed on their northward migration on March 31st, when 2,500 landed in Unit II and another 2,500 overflowed refuge units apparently headed west to Freezeout Lake. The first observation was also the peak number during migration, down from 30,000 in the spring of 1986. The first migrants south in the fall were 1,325 snows observed October 23. The peak also appeared much later than usual with 4,950 snow geese on November 9th.

Eight snow geese with black neck collars were observed during the fall and reported to the International Snow Goose Neckbanding Project. We found the white stylized letter-number combinations quite inconspicuous in resting flocks

and very difficult to read with a 30X scope. We may have missed neck collars in early migrants. Birds observed on the refuge were part of the 1,037 Western Canadian Arctic birds collared and banded by Canadian Wildlife Service in the summer of 1987. South of the Canadian autumn staging areas in Alberta and Saskatchewan, the western arctic birds showed the expected split in distribution; the majority going to wintering grounds in north and central California, and a smaller proportion taking the Central Flyway route to wintering areas in New Mexico and Mexico, as shown on the following map. The Benton Lake observations were the only ones for Montana, and the actual migration routes suggested from a small number of sightings in Colorado, Utah and Nevada.

Canada Geese

Canada geese (29) arrived early on February 9 and were selecting sites by the end of the month. A record 83 goose nests were located and marked. A second post hatch visit indicated Canada geese production on the refuge reached an all time high of 312 goslings.

TABLE IV

CANADA GOOSE NESTING

247 young in 50 nests known successful	
	8 nests unsuccessful, abandoned
	6 nests unsuccessful, predated
65 young in 17 nests unknown fate (75% assumed successful	
	2 nests unsuccessful unknown cause
	1 nest 2 year old practice nest

312 goslings 84 nests

Since 1981 the refuge and surrounding area has been closed to Canada goose hunting ~~through~~ during October. This has allowed protection of the resident flock until the production objective level of 450-500 goslings per year is met. There were only 2 geese bagged on the refuge, but goose hunters took quite a few birds (30 rough estimate) on uplands adjacent to the refuge. The refuge does not band geese so it is unknown what the harvest is for the locally raised geese.

A strange looking goose shot by a hunter on the Missouri River was turned over to the refuge for identification. Manager Pearson finally came up with the identification: an Egyptian goose, most likely missing from a game farm.

INTERNATIONAL SNOW GOOSE NECKBANDING PROJECT WESTERN CANADIAN ARCTIC SNOW GEESSE



FIGURE 1. Distribution of resightings of black neckbands: (+) denotes that at least one neckbanded bird was observed within degree block; (n) denotes the number of unique neckbands with completely read codes within province/state. Preliminary results to March 1988.

Ducks

Waterfowl arrived early when Chinook winds blew in 1,500 mallards and 95 common goldeneye on February 7. Fifteen northern pintail arrived on the 20th of February. By March 6 the weekly census revealed 210 Canada geese, 2,570 mallards, 2,100 pintail, and 190 common goldeneye. By the end of March 65,000 ducks were using the refuge including a peak 45,500 northern pintails and 4,320 swans. Eurasian wigeon are becoming regular springtime visitors, with a single bird again observed this year in March.

The fall migration peaked in September when local birds combined with early migrants peaked at 100,000 ducks. On October 15th, 50,000 pintails were counted. Waterfowl numbers remained high through most of October, but by November 2 had been reduced to 50,000.

An estimate of the annual waterfowl production on the refuge is obtained by sampling refuge nesting habitats to determine nesting densities and nesting success. DNC and native grassland sample plots were searched with a 200 foot cable/chain drag. Dikes and shorelines were dragged with a 50-100 foot chain pulled by 4x4 ATV's. Other habitats were sampled on foot. The DNC sample is set up so that the acreage searched would equal that made by one round trip with the 200 foot cable/chain drag. Two nest searches were completed; May 5-16, and June 2-15. Table V lists habitat acreages, nests located and estimated production.

The first survey total of 403 nests was up 39% from 1986 and was a surprise considering poorer water conditions in the spring of 1987. However, dragging started earlier than in 1986 resulting in a larger number of pintail nests that would have been missed if the drag had started any later in May. Of interest again was the buildup of nest densities in DNC fields. The 14.2 acre DNC field #7 contained 105 nests during the first drag, and reached a final total of 157 nests, or 11 per acre, and a 81.5% Mayfield nesting success. DNC #6 had 115 nests, 8.4 nests per acre, and 91.9% nest success. We wish these densities and nest success rates could be duplicated elsewhere on the refuge and/or district.

An overall 74.4% Mayfield nest success for 598 nests resulted in another good production year despite early spring low water conditions. Nesting success was phenomenal for early nests, but fox and skunk predation along the east boundary of the refuge later in the year reduced overall nesting success. The combined Mayfield nesting success for DNC fields was 81.4%.

A total of 652 nests were found in the two searches, down 12.8 % from the record 748 nests in 1986. Of these, 598 were normal nests used for nesting success calculations.

TABLE V

PRODUCTION ESTIMATES BASED ON NEST SUCCESS AND DENSITIES

	DNC	Grassland	Shoreline	Dikes	Alkali Bulrush	IVc Island	Circle Dike	DU Islands	Combined
Total Acreage	669	5873	778	54	2	1.5	3	7.6	7,388
Acres Sampled	96.5	300	47	19.6	2	1.3	3	7.6	477
Nests Found	291	87	105	57	8	6	34	10	598
Successful Nests	257	68	91	48	8	5	26	9	512
Mayfield Success Rate	81.4	57.3	77.2	78.3	100	63.3	37.9	100	74
Nests Initiated in Sample	285	119	118	61	8	8	37	10	646
Nests Initiated in Entire Habitat	1827	2323	1952	169	8	9	37	10	6,335
Nests per acre	2.73	0.40	2.51	3.13	4	6	12.33	1.32	
Number Successful Nests	1648	1331	1507	132	8	6	26	9	4,667
Number Successful Broods (1)	1220	985	1115	98	6	4	19	7	3,454
Total Ducklings/ Recruit (2)	6307	5029	5765	507	31	21	98	36	17,857

(1) Successful nests x brood survival rate of .74 (NPWRC)

(2) Number of successful broods x weighted average brood size at fledgling. Values from NPWRC & Pospahala et al

(3) Production of ducklings by this method is 17,857. Individual species production was not calculated due to small numbers of nests found in some habitats.

Nest success rates for each habitat were manually calculated using the Mayfield 40% method as described in Miller and Johnson (1978). The stratified Mayfield estimator was used in calculating the nest success rate for the seven DNC fields. This allowed all seven DNC fields to be treated as one habitat type, as described in Klett and Johnson (1982).

By using the Mayfield 40% success rate and the expanded nest density, a production estimate was calculated for each habitat type. The expanded nest density is an estimate of the total number of nest initiations per acre which accounts for the nests that were initiated and destroyed between searches. The expanded nest density is obtained by dividing the number of successful nests found by the Mayfield nest success. If the number of successful nests is multiplied by six ducklings per nest, as in past years, a total of 28,002 ducklings were produced in 1987.

Production is better defined as the number of ducklings fledged to flight stage. Therefore, a production estimate of sampled habitats was calculated by multiplying the number of successful nests (ie. number of broods) by a brood survival rate of 74% multiplied by a constant 5.17 ducklings to flight stage per brood. The 74% brood survival rate was based on mallard data from Northern Prairie Wildlife Research Center. Orthmeyer's (1986) refuge study of mallards also indicated a high rate (37%) of total brood loss. We calculated the constant 5.17 for fledged brood size based on a refuge weighted average for all species using brood size data from NPWRC and Pospahala et al (1974). Brood size at fledgling values included: 4.90, mallard; 5.78, gadwall and shoveler; 5.93, blue-wing teal; and 4.12 for pintail. The production figure of 17,857 ducklings produced is for sampled habitats which does not include over-water nesters such as ruddy duck, canvasback, redhead and scaup (and to some extent, mallard).

The following table presents the final refuge production estimate by species for all habitats. These figures were obtained by multiplying the 17,857 estimate by each species' relative percent composition of successful nests for upland nesters. We then multiplied over-water nesting scaup and redheads by a factor of two to account for nests not covered by our searches. Ruddy and canvasback production is by best guess. Mallard production was not factored to account for the overwater nesting occurring, so mallards are probably underestimated. In 1987, an estimated 19,780 ducklings made it to flight stage.

TABLE VI

1987 WATERFOWL PRODUCTION ESTIMATE

<u>SPECIES</u>	<u>% SUC. NESTS</u>	<u>PRODUCTION</u>
Mallard	10.1	1,804
Gadwall	24.8	4,429
Green-wing Teal	0.2	36
Blue-wing/Cinn Teal	10.3	1,839
Shoveler	15.5	2,768
Wigeon	3.2	571
Northern Pintail	32.9	5,875
Lesser Scaup	2.2	1,179
Redhead	0.8	429
Canvasback	—	30
Ruddy	—	820
Total Production Estimate to flight stage:		<u>19,780</u>



Pintail broods were abundant in June and July.
07/87 MISHLER

4. Marsh and Water Birds

Much of the information on nesting birds in this and the following section was collected during the Colonial Birds Survey and whenever possible during other refuge surveys.

An estimated 9 white-faced ibis nests were counted along with several black-crowned night herons in Unit VI. An estimated 500 eared grebes nested on the refuge, mostly in Units I, II and VI. A sora rail nest with 12 eggs was found in the alkali bulrush nesting transect. Other species possibly nesting on the refuge, but for which numbers of nests were not counted, included sora, pied-billed grebe, and American bittern. Species seen on the refuge but not expected to have nested include: western grebe, great blue heron, double-crested cormorant and American white pelican. Pearson and Linehan confirmed the identification of the first State record for a yellow-billed loon on the Missouri River near Great Falls on January 6.

5. Shorebirds, Gulls, Terns and Allied Species

Franklin's gull colonies were sampled for density estimates and size in July after hatching to eliminate nest disturbance. Four 10,000 square foot samples were taken in the colony located this year in Unit VI. The colony size was estimated to be 70 acres and contained an estimated 8,580 nests, down from 22,000 nests in three colonies in 1986. California gulls nested on several islands in Units V, and VI.

Common tern nests were observed on various islands in Unit V and VI on June 2 and 4. A total of 46 nests were counted; not including island VI-#83Sr1 where considerable young and nests were observed, but a count^{was} not made to avoid unnecessary disturbance. The same island had 38 nests in 1986.

<u>ISLAND #</u>	<u>UNIT</u>	<u># TERN NESTS</u>
85Lp6	V	18
85Lp7	V	11 (w/3 young)
85Lp19	V	13
83Sr1	VI	50? (Not counted to avoid disturbance)
83Sr8	VI	44

Black-necked stilts were observed nesting in Units V & VI. Nests of upland nesting shorebirds found during nest dragging operations included: willet (6), marbled godwit (6) and upland sandpiper (2). Other shorebirds nesting successfully included American avocets, Wilson's phalarope, and killdeer.

Also nest w/ 6 fledged
on west end near
unit I

6. Raptors

Eight short-eared owls nests were located during nest dragging of refuge uplands. A burrowing owl fledged young from a burrow located a short distance from the auto tour route road despite continual disturbance by visitors trying to get photos. Northern harrier, Swainson's hawk and great horned owl also nested. Other raptors observed on the refuge this year include snowy owl, red-tailed hawk, rough-legged hawk, golden eagle, Cooper's hawk and gyrfalcon.



Short-eared owls also enjoyed high nesting success rates.
87-03-1 05/07/87 GLS

7. Other Migratory Birds

The refuge again participated in the national mourning dove coo counts, running transects in Chouteau and Toole Counties. Baird's sparrow was recorded as nesting on the refuge this year. The refuge documented western kingbird nesting for the first time.

8. Game Animals

White-tailed and mule deer use on the refuge has remained constant in recent years. Whitetails were observed mostly in the cattails in Units II & III while the mule deer were frequently seen on the eastern end of the refuge. A whitetail doe with twins was frequently seen in Unit IVB. Pronghorn use on the refuge is intermittent. One small herd consisting of one buck and four does was visible from the tour route throughout the summer around Units I & II.

10. Other Resident Wildlife

Ring-necked pheasant populations have not rebounded from the effects of the winter of 1985. Pheasant crow counts this spring averaged 0.7 calls per station, up from last years' low of 0.4, but still down from 3.0 in 1985. Gray partridge appeared to have increased in numbers this year and were a common sighting by fall. Sharp-tailed grouse have never been abundant on the refuge with one or two birds the usual observation. However, this year they were seen more frequently and were suspected of nesting. A search for a refuge dancing ground came up empty handed and no nests were located while nest dragging.

*4th Brood seen @ Entrance shelter. Oct
in 1987*

15. Animal Control

The control program for California gulls consists of general harassment by shooting and disturbing nests during the early part of the year in order to displace the gulls from refuge islands. The refuge is seeking to keep the gull colony at about 50 nests per year. A total of 3 staff days were expended for gull control on 14 different days from April 4 through June 2. This effort eliminated a total of 147 California gulls and 10 ring-billed gulls by shooting, and destroyed another 59 nests with eggs from islands in Units VI, V, and the new DU island in IVB.

Predator removal efforts continued this year in accordance with the 3-year predator control study initiated in 1986. Control activities again focused on skunks and raccoons. The objective of the study is to evaluate the effectiveness of selective predator removal for increasing waterfowl nesting success.

Trapping began on March 2 and continued through July 15. A total of 4176 trap days resulted in the removal of 12 skunks and 5 raccoons. Incidental species caught included nine Richardson's ground squirrels, three yellow-bellied marmots, one badger, one feral dog, one cottontail rabbit and one crow. A total of 18.75 staff days were used to conduct this year's trapping program, which included initial trap setting and storage.

A maximum of 50 220-conibears and 12 live traps were set at any one time. We anticipated early predator activity with such a mild winter but surprisingly did not begin to catch target species until late April. We avoided placing any traps in areas which were readily accessible to the public. Several live traps were used around the tour route to reduce the possibility of injuring visitors and/or their pets.

Primary bait used this year was fish which we allowed to ferment before placing in the traps. The Montana Fish, Wildlife and Parks fish hatchery in Great Falls supplied us

with an unlimited free supply of bait. Approximately 30 pounds of bait was used per week to bait traps because of heavy use by Richardson's ground squirrels.

A total of 4,167 trap nights removed 12 skunks and 5 raccoons this year compared to 65 skunks and 21 raccoons last year. We believe there was a residual effect or absence of predators early this year due to last year's trapping. All raccoons were male and were caught between May 12 and June 8. More than half of the skunks were caught during the month of June and there was virtually no predator sign, tracks or activity during March and April when we could expect to catch the bulk of "local" critters. Nesting success was higher in April and May. Success of the trapping program is not measured in the number of predators trapped, but in the number of nests protected as evidenced by successful nests. In the year prior to predator treatment, refuge nesting success was a miserable 18.6% Mayfield.

An additional 5 raccoon were taken in traps placed at duck banding sites in August and September. A breakdown of the trapping program by month is as follows:

<u>Month</u>	<u>Skunk</u>	<u>Raccoon</u>	<u>Trap Days</u>
March	1	0	403
April	2	0	1040
May	2	3	1147
June	5	2	1110
July 15	<u>2</u>	<u>0</u>	<u>476</u>
Total	12	5	4176

16. Marking and Banding

Only ducks of the "National Species of Special Emphasis" persuasion were banded this year. By coordinating with the Outdoor Recreation Program at Malmstrom Air Force Base, we were able to recruit 9 volunteers who donated 63 hours to the mallard banding effort.

A total of 2,318 ducks were banded in 1987. Of this total, 2,015 were mallards, 295 were pintails and 8 were redheads. Banded species composition consisted of 86.9% mallard, 12.7% pintail and 0.4% redhead. The percentage of hatching year mallards, pintails and redheads caught were 38%, 46% and 100%, respectively. Table VII gives the species and age-sex breakdown while Table VIII is a summary of banding statistics.

TABLE VII

1987 BANDING STATISTICS

Species	Age-Sex				Total	% Species Composition	% HY
	AHY-M	AHY-F	HY-M	HY-F			
Mallard	760	498	434	323	2015	86.9	38
Pintail	66	92	69	68	295	12.7	46
Redhead	0	0	5	3	8	0.4	100
Total	826	590	508	394	2318	100.0	

TABLE VIII

1987 BANDING STATISTICS

Maximum number of traps in operation	6
Number of days trapping and baiting	28
Number of trap days	129
Average number of traps/day	4.61
Average number of new ducks/day	83
Average number of mallards banded/day	72
Average number of new ducks/trap/day	18
Most number of ducks banded in one day	212
Average number of pounds of bait/trap/day	45
Total number of different trap sites	10
Total pounds of bait used	7800
Bushels of bait used	129
Number of ducks killed during trapping	12
Total number of ducks banded	2318
Total number of mallards banded	2015

Salt

A total of 6 Colorado Plains duck traps were used at 10 locations for 129 trap days. Seventy ducks recaptured this year were returns to Benton Lake. Fifteen mallards banded at other locations were also trapped. A total of 1,143 ducks were recaptured, including ducks banded this year. Twelve ducks died in the traps due to drowning during banding operations. The average number of new ducks banded per day was 83, with an average of 72 mallards banded per day. The average number of new ducks per trap per day was 18, with an average of 12 new mallards per trap per day. The highest number of ducks banded in one day was 212. An average of 45 pounds of bait was used daily at each of up to 10 trap locations. A total of 7,800 pounds (129 bushels) of bait was used during the banding season. Twelve ducks died during the banding season due to drowning, or trapping mortality was 0.3%.

unnecessary duplication
of table VIII info



Volunteers from Malmstrom AFB supplied the needed manpower to accomplish this year's duck banding.
 87-13-01 09/98 DL

17. Disease Prevention and Control

Fortunately, botulism attributed mortality was again low this year. Routine checks for botulism were initiated on July 8, 1987, and continued through September. Hot spots in each unit are checked as well as a quick survey of the entire unit. Clean-up operations are conducted to stop the carcass/maggot cycle. The YCC enrollees helped dispose of a deer carcass in Unit V. The bulk of our losses occurred during July. Total loss for 1987 was estimated at less than 150 birds. A total of 83 birds and mammals were picked up during our periodic botulism patrols. The following is a summary of this breakout:

35 Ducks
 14 Eared Grebes
 13 Avocets
 8 Franklin's gulls
 4 Coots
 2 Black-necked Stilts
 1 Common Tern
 6 Muskrat

H. PUBLIC USE

1. General

Outdoor writer George Harrison toured the refuge and discussed the DU islands, refuge duck production, and fall forecast for an article in the October issue of Sports Afield.

An official dedication ceremony for the Ducks Unlimited project on Unit IVB was held in August with dignitaries representing FWS, DU and the Anheuser-Busch Company. ARD Nels Kverno, Manager Pearson and former Assistant Manager Tom Tornow gave speeches for the FWS. The gathering was well financed by DU and Anheuser-Busch and included food, liquid refreshments and entertainment. The dedication was well covered by the local television stations. A permanent stone marker and plaque recognizing the joint project and Anhauser-Busch's financial contribution was installed at the project site along the auto tour route.



ARD Nels Kverno is shown addressing the crowd while Manager Pearson waits his turn. The Unit IVB project site is in the background.

87-11-17

08/06/87

TT



Sign Plan candidate? This temporary sign guided
visitors to the DU ceremony site.
87-11-31 08/06/87 GLS

2. Outdoor Classrooms - Students

The Great Falls School District conducts field trips to the refuge for all third and seventh graders in the District. School district environmental educators John Cannon and Dennis Maxson have been recognized nationally for their excellent program. In total 1,790 Great Falls District students visited the refuge with about 40 frazzled teachers during the spring of the year.

Several conducted tours were given by refuge personnel for outlying schools and groups including: Lady of Lourdes School, Benton Lake School, Carter and Knees Schools, Denton Junior High and various Boy Scouts troops.



Assistant Manager Sullivan explained the mission of the Service to this group of impressionable school children.

87-03-87

05/19/87

DL

5. Interpretive Tour Routes

A nine mile tour route loop allows visitors to view refuge uplands and three of six refuge water impoundments. The refuge tour route is open to visitor use during daylight hours only and is closed between December 1 and March 1 of each year. Nice weather allowed for the early opening of the tour route on February 18th this year.

Discussions were held with the Regional Office staff concerning a proposal to alter the route to allow visitor access to the IV-IV dike. Although this would be much better route for visitors, the refuge successfully opposed the idea because of the resulting disturbance to nesting waterfowl. Work was completed on a new auto tour route leaflet featuring ten interpretive stops and should be available in the spring of '88.

A visitor kiosk station was constructed at the entrance of the auto tour route. We are indebted to C.M. Russell NWR's Greg Siekaniec and Randy Ramsbacher who did an outstanding job in constructing the kiosk.



The new kiosk was constructed at the entrance to the tour route and headquarters. The kiosk displays the excellent workmanship by CMR's Greg Siekaniec and Randy Ramsbacher.

87-08-29

07/29/87

GLS

8. Hunting

We advertised hunt program changes (see D.2) through a news article and the new hunt brochure as well as changes in signing. One cork-panel was used on the refuge kiosk for 'hunting information' such as regulations, hours, etc. The new hunting brochures arrived just prior to the opening and were made available at the kiosk and parking lot dispensers along the Bootlegger. The three older bulletin boards were dismantled. Areas open and closed to hunting were signed and the tour route was signed closing it to firearms.

Overall there were fewer hunters and few complaints regarding the decrease in areas to hunt. Some hunters grumbled about the closure of Unit III, which this year held the majority of refuge geese. Hunting success on opening weekend was excellent (2.8 birds/hunter). Goose hunting was generally poor on the refuge with only 2 known harvested, while hunting on adjacent private lands was better than in recent years. We continued to see a decline in hunter numbers; down from 794 last year to 405 this year. Warm weather kept water open and birds on the refuge throughout November, but hunting pressure was very light.

This was the last year for lead shot at Freezeout WMA, so next year we could see a large increase in hunters. We've included a chart which shows the historical hunting use on the refuge and the declines in hunters in recent years. Besides the steel shot requirements, other likely factors in hunter use decline include reported high endrin levels in waterfowl, license fee increases and the costs of State and Federal stamps.

TABLE IX

HUNT PROGRAM HISTORY

Year	Acres	Units Open	Visits	Ducks	Geese	Swan	Cost
1966	3776	III,V	1540	1906	9	-	-
1967	3776	III,V	1540	2711	9	-	-
1968	4656	IV,VI	3202	5275	15	-	-
1969	4656	IV,VI	2846	4178	16	-	-
1970	4656	IV,VI	2056	2870	0	-	-
1971	4024	I,II,III	1808	3876	7	-	-
1972	2039	I,II,III	4188	6952	54	-	-
1973	1428	II,III	1930	1984	8	-	-
1974	2224	II,III,IV	3464	5013	36	-	-
1975	3700	II,III,IV	2795	3970	22	-	-
1976	2042	II,IV,V	3516	4635	10	-	-
1977	1461	II,V	2148	2532	98	-	4600
1978	3855	IV,V,VI	2050	9470	50	-	3100
1979	3855	IV,V,VI	1650	3373	10	-	3000
1980	5000	IV,V,VI	2070	3885	9	-	4000
1981	5000	III,IV,VI	1230	2552	15	4	2550
1982	5000	III,IV,VI	1821	2956	47	6	2700
1983	5000	III,V,VI	2097	4097	92	66	4700
1984	7200	III,IV,V,VI	2482	1906	57	29	-
1985	7200	III,IV,V,VI	724	497	50	1	-
1986	7200	III,IV,V,VI	794	1047	0	0	1600
1987	4300	IVC,V,VI	405	842	2	1	2050

The tour route remained open throughout the hunting season but received only light use. Unfortunately our traffic counters were out of service so we did not obtain accurate numbers. We issued a general news release and a note in the local Audubon newsletter informing the public of the tour route's availability during October and November. Our observations indicated no apparent changes or negative impacts to migrational use on Units I & II resulting from changes in hunting areas or the tour route being open during the hunting season this year.



A hunter and his dog are shown with the only tundra swan known to have been harvested on the refuge this year.

87-17-24

11/87

DDL

Law enforcement efforts this year concentrated on helping hunters adjust to the changes. In general, there was little confusion, and except for an incident of unknown perpetrators shooting from the auto tour route, there were no wrong hunting area violations. Total cost for administering the hunt program this year was estimated at \$2,050; \$1,550 of which was in overtime, and \$500 in administrative costs including pamphlets and signing.

TABLE X

1987 HUNTING SUMMARY

	Cars	Hunter Visits	Bagged Ducks/ Ducks	Ducks/ Hunter	Bagged Geese	Bagged Swan	Pheas/ Huns
Opening Weekend	118	243	671	2.8	0	0	0
Remaining October	53	102	141	1.4	0	0	2/1
November	<u>33</u>	<u>60</u>	<u>30</u>	<u>.5</u>	<u>2</u>	<u>1</u>	<u>3/0</u>
Totals	204	405	842	2.1	2	1	5/1



Refuge Manager Pearson explained steel shot requirements in a television interview.
87-PR 9/87 DL

17. Law Enforcement

Refuge LE staff held a meeting with SRA Rod Hanlon prior to the waterfowl opener to review regulations and case handling. LE patrols were conducted each weekend and occasionally midweek.

Six NOV's were issued during the year including: 1 - exceeding field possession limit; 1 - MBTA/cormorant; 2 - violation State Law (no swan permit); 1 - no duck stamp; and 1 - refuge regs (coyote). Refuge officer Sullivan did an outstanding job of LE during his first season; making five of the six cases above.

I. EQUIPMENT AND FACILITIES

1. New Construction

The only new construction for the year was the visitor kiosk station.

2. Rehabilitation

Three new cistern units were added to the domestic water system doubling the storage capacity from 4,500 to 9,000 gallons. In 1986 we installed 2 3/4 miles of 1 1/2 inch plastic pipe connecting the refuge headquarters cistern to a rural water association. The system delivers 2 gallons per minute and no problems occurred in its first year of operation. In the spring of the year, some finishing touches, including grading, rock picking, and minor filling were completed where the pipeline construction crossed several farm fields.



Three new cisterns were added to the water storage bringing total capacity to 9000 gallons.

87-13-06

9/87

RLP

The 20 year old regular gas pump and tank were replaced with new ones purchased and installed by Smith Equipment. The old tank was peppered with tiny holes and several quarter-size holes. A leak in the gas tank filler on the new gas tank was discovered and later repaired by Smith equipment.

A major winter project was the installation of insulation, plywood sheeting and painting of the 40' X 40' carpenter shop in the new (1986) 40' X 155' cold storage building. Vince Marko also assisted contractor Rudy's Electric with installing electrical wiring and outlets to the new storage building.

Another major rehab project was the construction of additional bathrooms in both refuge residences. The project escalated when problems with the existing plumbing and electric wiring surfaced as the project progressed. Occupants of Quarters #82-81 cooperated by vacationing in Florida during the construction period, but were not compensated for such assistance. Both bathrooms were completed in due time but at considerable expense.

3. Major Maintenance -

Facilities

The Muddy Creek pumpsite is located 28 miles west of headquarters. Weeds and debris are annually cleaned with backhoe along the thirteen mile Lake Creek canal prior to spring pumping. The ditch is often full of kochia and other "tumbleweeds" from surrounding farmland. Prior to pumping, the dam is set up and the pumps and other equipment made operational. At the end of the season the dam is taken down and the pumps and pumpsite serviced and winterized. During the pumping season (May through September) the pumps are checked three times a week for servicing (oiled) and trash rack cleaning. Extra visits are necessary for any power outages caused by lightening, etc. This year's maintenance to the pumps included replacing two butterfly cut-off valves. Contractor Dan Tripp installed the valve with the assistance of Vince Marko. A coil for the time delay switch was replaced by Enterprise Electric. (See F,2)

Water structures receiving maintenance included the addition of rock rip-rap to water control structures on Burgmeier's land along Muddy Creek. Work was at last finished on the four inter-unit pumping structures. Unit III pumpsite was sloped, rip-rapped and gravelled. All four inter-unit pumpsites are now functional although top decking and guard rails are still needed on III and IV. *wrong!*



Rock rip rap was the finishing touch on the Unit III
pumpsite.

87-07-31

07/87

RLP

Roads and Dikes

The tour route was graded and rock picked in September in preparation for a road gravelling project in October. Gravel (330 cu. yd.) was spread on a portion of the auto tour route by Dickman Gravel. In November, the auto tour route road from Unit I to the junction of Unit II (north side - 1.3 miles) was widened 6 feet and gravelled by Engineering Equipment Operator Vince Marko. The roadside ditch consisting of crested wheatgrass was burned prior to dirt work. Good weather stayed with us allowing completion, so another half mile was begun to test December's weather. We received 666 yards of gravel which was stockpiled for spreading next spring after the new dirt settles.

Equipment

All refuge furnaces were inspected and serviced by maintenanceman Patrick Nies and chimneys cleaned prior to the heating season. The office vehicle stall heater was taken out of service after a crack was found in the plenum. Repairs were made to the interior of Quarters 82, including new doors and lighting. An electrical outlet and additional wiring were added to the office basement to facilitate use of the new slide file cabinets. Two pump racks were fabricated for proper storage of inter-unit pumps.

Major repairs and servicing were completed on the following:

Case backhoe	hydraulic system leak, replaced one cylinder rod on stabilizing pad,
road grader	radiator repair, servicing
'78 Ford	brakes, wheel bearings, driveline
'80 Dodge	driveline, servicing
'79 Suburban	wheel bearings, servicing, pinion bearing
'79 Luv's	servicing, carburetor repairs
'79 Dodge	electric wiring, driveline
Airboat	repairs to hull

4. Equipment Utilization and Replacement

A 1987 Chevy Astrovan was picked up at a local dealer; warranty work included a dent in the rear bumper and a tear in the carpet. In an interesting development, Refuge Manager Pearson headed west with the new Astrovan and returned the following day with a well used '79 Chevy Luv. The AstroVan is rumored to be hidden somewhere in the desert where nobody will ever find it. (Actually, Fish Springs now has the AstroVan and will purchase us a new front wheel drive minivan with FY 88 funds.)



The new Navistar 10 cu.yd. dump truck adds power to refuge earth moving/hauling capabilities.
87-08-02 06/22/87 GLS

Minutes after a manufacturer's service/training representative for the new Navistar International dump truck

(10 cubic yards) left the refuge, the truck's transmission froze. A shifting linkage for the transmission had to be replaced under warranty.

A cab with ROPS was installed on the Allis-Chalmers grader picked up on surplus from the Air National Guard last year. The new grader has worked well but has needed several repairs. The older Wabco grader was transferred to Lee Metcalf NWR. Lee Metcalf maintenanceman Cal Henry received a day's training here on the Wabco road grader.



A certified welder installed a ROPS cab to the Allis-Chalmers grader. Grader was picked up on excess property from the Air National Guard.
7-09-31 08/87 RLP

The Dodge stake truck and old Chevy Chevelle station wagon were sold through GSA and picked up by their new owners.

We received a new Wajax 200 gallon fire pumper which will be a major improvement to our fire program. The heated stall in the shop that formerly housed the water truck was reorganized and will now be used for fire equipment and storage. The water truck was not used much this year and awaits a final decision about its future use.

Two slide cabinets were purchased and Pearson sorted, sifted, indexed and filed some 5,000 refuge slides. A new hot water heater was added to the house trailer. A Canon AE-1 camera was purchased.

5. Communications Systems

An AT&T Merlin phone system with 2 lines was installed but has been plagued with background noise. Remote radio control units were installed in refuge residences.

Manager Pearson met with Enterprise Electric/Manufacturing and Mountain Bell representatives to explore the use of a remote sensing setup to allow us to monitor pump status at the Muddy Creek pump site. We've explored several monitoring alternatives (radio, telephone line), but so far all appear too expensive.

6. Computer Systems

The refuge entered the computer age, late but in style, when it received a Zenith 286 microcomputer with a 40 megabyte hard drive, Courier 2400 Modem and Fujitsu dot matrix printer. Accompanying software included Wordperfect, dBase III+, poly-COM/220, and Lotus 1-2-3. A utility program, QDOS, arrived later and has been helpful in organizing and using the hard disk.

Regional Office computer coordinator Mike Long spent a week at the refuge teaching the basics of computer operation and dBase. Refuge personnel also received training at the local Vo-Tech School. Because of her newly acquired computer skills, Refuge Assistant Betty Benway was asked to present a short session on WordPerfect at the computer session of the administrative workshop.

The hard disk malfunctioned twice during the year but each time backup copies were available on floppy disk and no harm was done. We hope we solved the problem by cleaning out our root directory and placing application programs, batch files, and user areas in subdirectories.

J. OTHER ITEMS

3. Items of Interest

While visiting the refuge, Regional Zone Supervisor Barney Schranck presented Refuge Manager Pearson with his 30-year Service Pin. Among the refuge notches on Bobs' belt are Benton Lake, National Elk, Brown's Park, Salt Plains, Fish Springs, Tishomingo, and Monte Vista.

4. Credits

Pearson wrote the Introduction and Section F,2. Benway wrote Sections B and E, 1-5. Linehan wrote the rest of the report using WordPerfect. Editing was done by Pearson et al. Benway compiled the entire report using WordPerfect.

K. FEEDBACK

There is a time for further study and a time for action. The contaminant problem at Benton Lake is fast approaching the needed action stage. Results have recently confirmed that contaminants such as selenium, boron, and arsenic are present in the water, sediment and biota at Benton Lake at levels demonstrated to cause reproductive problems in waterfowl. High levels have been found in bird livers and waterfowl eggs. Only gross deformities and reproductive impairment have yet to be found. It is unwise to wait until the bodies are in hand before taking remedial action. One of our fears is that procrastination will set in if the problem is seen as too big and unmanageable. The biological and chemical relationships are certainly complex, and the number of entities involved in management only further muddy the water (Bureau of Reclamation, Refuges, FWE Contaminants, private landowners). Too often the Service (or Refuges) waits for other entities (they've got the big bucks, right!) to take the initial action.

What is clearly known and documented is that the saline seeps on the south end of the refuge, and similar areas on private lands that have been tiled and/or ditched into Lake Creek, are a (or the) major source of water contaminants effecting refuge waters and biota. What is encouraging is that the agriculturally induced saline seep problem is manageable. The cause of saline seeps is the fallow-crop system on adjacent farmlands. It has been demonstrated by the Montana Salinity Control Association that saline seep areas can be successfully reclaimed by establishing permanent cover on delineated recharge areas. What's needed, and the sooner the better, is a cooperative program between the refuge and its neighbors similar to (or piggyback with) the Conservation Reserve Program, with support from FWS, Montana Salinity Control Association, SCS and ASCS. If cropland recharge areas on adjacent lands could be planted to permanent vegetative cover, our water quality would improve, with additional nesting cover thrown in as the bonus. Let's get on with it!

**BENTON LAKE
WETLAND MANAGEMENT DISTRICT**

Great Falls, Montana

ANNUAL NARRATIVE REPORT

Calendar Year 1987

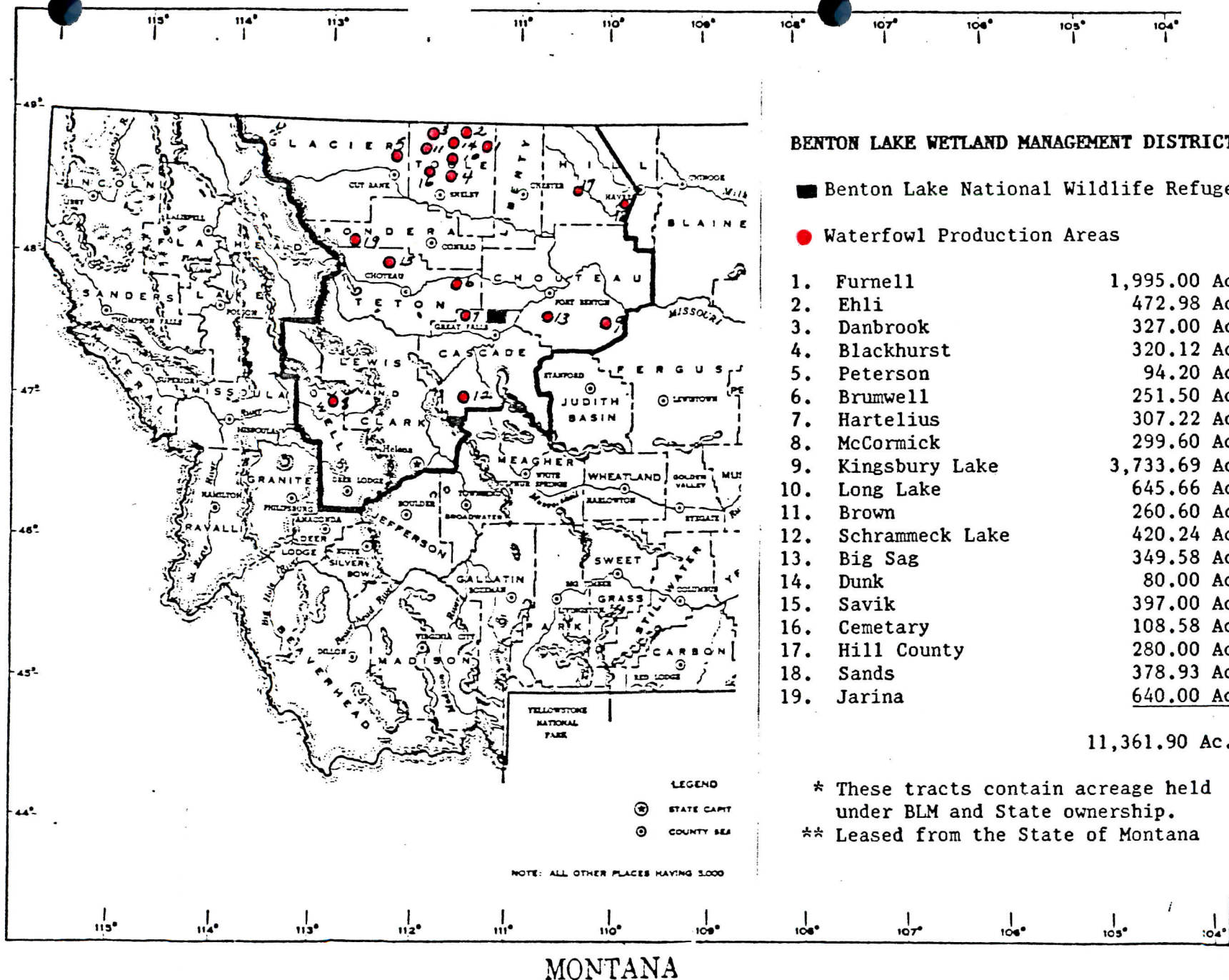
INTRODUCTION

The Benton Lake Wetland Management District (WMD) was established in 1975 to initiate the Small Wetlands Program in north-central Montana. Stretching across ten counties, the WMD is spread over 25,000 square miles, an area roughly the size of West Virginia (Figure 1). Topography within the district ranges from mountainous terrain in the west, to the short-grass prairie of the northern Great Plains in the east.

Initial delineations began in 1966 and were completed in 1975. Some 48,000 acres were delineated for fee purchase proposals. Acquisition first started in 1974, with the majority of the easements and fee title tracts being acquired between 1975 and 1981. Since then acquisition efforts have focused on acquiring wetlands with more permanent water and roundouts of existing waterfowl production areas (WPA's).

Management responsibilities on the district include 19 WPA's totalling 11,361 acres. These tracts are widely scattered across eight counties and range in size from 80 acres to 3,734 acres. The average driving distance to the WPA's from headquarters is 90 miles, making management difficult to say the least. Two WPA's are located 120 miles away - each in opposite directions.

Perpetual wetland easements are scattered across all ten counties. Easement tracts cover nearly 90,000 acres of private land protecting 7,088 acres of wetlands from drainage, burning and filling.



INTRODUCTION

TABLE OF CONTENTS

Page

A. HIGHLIGHTS

1

B. CLIMATIC CONDITIONS

2

C. LAND ACQUISITION

1. Fee Title	2
2. Easements	6
3. Other	Nothing to Report

D. PLANNING

1. Master Plan	Nothing to Report
2. Management Plan	7
3. Public Participation	Nothing to Report
4. Compliance with Environmental and Cultural Resource Mandates	7
5. Research and Investigations	8
6. Other	Nothing to Report

E. ADMINISTRATION

1. Personnel	9
2. Youth Programs	Nothing to Report
3. Other Manpower Programs	Nothing to Report
4. Volunteer Programs	Nothing to Report
5. Funding	Nothing to Report
6. Safety	Nothing to Report
7. Technical Assistance	9
8. Other	Nothing to Report

F. HABITAT MANAGEMENT

1. General	Nothing to Report
2. Wetlands	12
3. Forests	Nothing to Report
4. Croplands	13
5. Grasslands	13
6. Other Habitats	Nothing to Report
7. Grazing	Nothing to Report
8. Haying	Nothing to Report
9. Fire Management	Nothing to Report
10. Pest Control	13
11. Water Rights	15
12. Wilderness and Special Areas	Nothing to Report
13. WPA Easement Monitoring	15

G. WILDLIFE

1. Wildlife Diversity	18
2. Endangered and/or Threatened Species	19
3. Waterfowl	19
4. Marsh and Water Birds	21
5. Shorebirds, Gulls, Terns, and Allied Species	22
6. Raptors	22
7. Other Migratory Birds	Nothing to Report
8. Game Mammals	22
9. Marine Mammals	Nothing to Report
10. Other Resident Wildlife	22
11. Fisheries Resources	Nothing to Report
12. Wildlife Propagation and Stocking	Nothing to Report
13. Surplus Animal Disposal	Nothing to Report
14. Scientific Collections	Nothing to Report
15. Animal Control	Nothing to Report
16. Marking and Banding	Nothing to Report
17. Disease Prevention and Control	Nothing to Report

H. PUBLIC USE

1. General	24
2. Outdoor Classrooms - Students	Nothing to Report
3. Outdoor Classrooms - Teachers	Nothing to Report
4. Interpretive Foot Trails	Nothing to Report
5. Interpretive Tour Routes	Nothing to Report
6. Interpretive Exhibits/Demonstrations	Nothing to Report
7. Other Interpretive Programs	Nothing to Report
8. Hunting	24
9. Fishing	24
10. Trapping	24
11. Wildlife Observations	Nothing to Report
12. Other Wildlife Oriented Recreation	Nothing to Report
13. Camping	Nothing to Report
14. Picnicking	Nothing to Report
15. Off-Road Vehicling	24
16. Other Non-Wildlife Oriented Recreation	Nothing to Report
17. Law Enforcement	25
18. Cooperating Associations	Nothing to Report
19. Concessions	Nothing to Report

I. EQUIPMENT AND FACILITIES

1. New Construction	Nothing to Report
2. Rehabilitation	Nothing to Report
3. Major Maintenance	Nothing to Report
4. Equipment Utilization and Replacement	Nothing to Report
5. Communications Systems	Nothing to Report
6. Computer Systems	Nothing to Report
7. Energy Conservation	Nothing to Report
8. Other	Nothing to Report

J. OTHER

1. Cooperative Programs	27
2. Other Economic Uses	Nothing to Report
3. Items of Interest	27
4. Credits	27

K. FEEDBACK	Nothing to Report
-----------------------	-------------------

L. INFORMATION PACKET (inside back cover)

A. HIGHLIGHTS

The district experienced another year of drought, resulting in the poorest wetland conditions since the WMD was established (F2).

An increased emphasis on easement enforcement resulted in the detection of eight violations (F13).

Nearly 460,000 acres of highly erodible cropland in the WMD were converted to perennial cover under the Conservation Reserve Program (CRP) of the 1985 Farm Bill (E7).

The cooperative farming program was phased out and 70 acres of cropland seeded back to dense nesting cover (F4).

The 123 acre Jarina WPA land exchange was finalized (C1).

B. CLIMATIC CONDITIONS

Climatic conditions are discussed in detail in the refuge narrative report.

Once again light winter snow pack and a dry spring resulted in below normal precipitation. After three straight years of drought from 1982 through 1985, and marginal precipitation last year, we had hoped that 1987 might turn things around. This wasn't the case and without above normal precipitation next year, the wetlands situation will continue to look grim.

C. LAND ACQUISITION

1. Fee Title

The wetland district currently has 19 WPA's totalling 11,361.9 acres (Table I). Included in this total are 9,139.42 acres held in fee title with the remaining acreage under Bureau of Land Management (BLM) and state ownership. The 280 acre Hill County WPA is leased from the State of Montana.

TABLE I

FEE TITLE ACRES BY COUNTY

County	Acquisition Goal	Number of WPA's	Total Acres
Toole	4,675	8	4,209.94
Chouteau	2,500	2	2,140.79*
Cascade	2,000	2	727.46
Hill	1,000	2	378.93**
Teton	2,251	2	648.50
Pondera	2,000	1	640.00
Powell	1,300	1	299.60
Glacier	2,096	1	94.20
Liberty	2,000	0	0
Lewis & Clark	500	0	0
Totals	20,322	19	9,139.42

*An additional 1,942.48 acres of State and BLM lands are contained within WPA boundaries.

**An additional 280 acres are leased from the State of Montana (Hill County WPA).

In 1986 the Service began negotiations to exchange an isolated 123 acre parcel of the Jarina WPA for 120 acres of private land lying adjacent to the main portion (520 acres) of the WPA (Figure 2). The exchange resulted in a net gain of 13 wetland acres and higher quality nesting cover. An ascertainment report and environmental assessment were prepared and submitted to the Washington Office for Congressional approval. In August the exchange was finalized resulting in the consolidation of FWS lands into a single management unit.



A beautiful Type IV wetland on the Jarina WPA lies adjacent to the Rocky Mountain Front. The land exchange completed this year consolidated the WPA into a single management unit.

87-6-24

05/29/87

GLS

A second exchange was proposed by another landowner involving 340 acres of the Jarina WPA for an adjacent 440 acres of private land. Public access and trespass hunting onto the adjacent ranch were the basis for their proposal. In May ARM's Linehan and Sullivan inspected the area to evaluate the proposed exchange. Although it would have resulted in a net increase in total wetland acres, a decision was made to retain our lands based on the lack of quality nesting cover and availability of more permanent wetlands on the proposal exchange land.

No new fee tracts were purchased this year. ARM Sullivan inspected several possible fee acquisitions in Teton and Liberty Counties.

A 1333 acre tract in the Sweetgrass Hills of Liberty County was recommended for purchase. It lies in a glaciated pothole region along the Canadian border and contains an excellent wetland complex. The ascertainment report was approved but acquisition dollars weren't available. In November ARM Sullivan inspected the tract with The Nature Conservancy (TNC) Biologist Bernie Hall to discuss the possibility of a cooperative purchase agreement. Hall was impressed with the tract and expressed interest in assisting with the acquisition. The Service intends to solely purchase the unit next year if funds are available.

In December ARM Sullivan and Realty Specialist Rich Johnson met with Mervin Nagy to discuss a possible roundout purchase for the Ehli WPA. Nagy owns a portion (45 acres) of the largest wetland basin on the WPA. Acquiring this roundout would allow us to install a water control structure and hold more runoff in the basin. Nagy agreed to sell a 120 acre tract which he was purchasing from a third party under contract for deed. The deal fell through when the third party refused to sign the purchase option. Nagy was not interested in granting the Service a flowage easement, but we plan to continue to pursue this acquisition.

At the end of year we began working on an acquisition for a large roundout of the McCormick WPA in Powell County. The tract is part of the North Fork Ranch which covers 1880 acres of the Ovando Valley. The ranch is experiencing financial problems and may undergo foreclosure by the Federal Land Bank. A wetland acquisition proposal was submitted for an 800 acre roundout on the east side of the WPA. Trespass grazing from the North Fork ranch has been a long standing problem on the McCormick unit. In the past much of this trespass occurred across the east boundary where the fence bisects a large Type IV wetland. Acquisition of this tract would eliminate this problem and remove a bird strike hazard from the marsh.

Development opportunities of this roundout would include the restoration of 173 acres of drained wetlands. Two large wetland basins can be restored and the surrounding cropland planted to dense nesting cover. A portion of the 250 acres of cropland would continue to be farmed for waterfowl and sandhill cranes. We hope the proposal is approved and receives high regional priority.

FIGURE 2

Branch of Realty

OWNER: William H. Jones Land Exchange

TRACT NO.: (18)

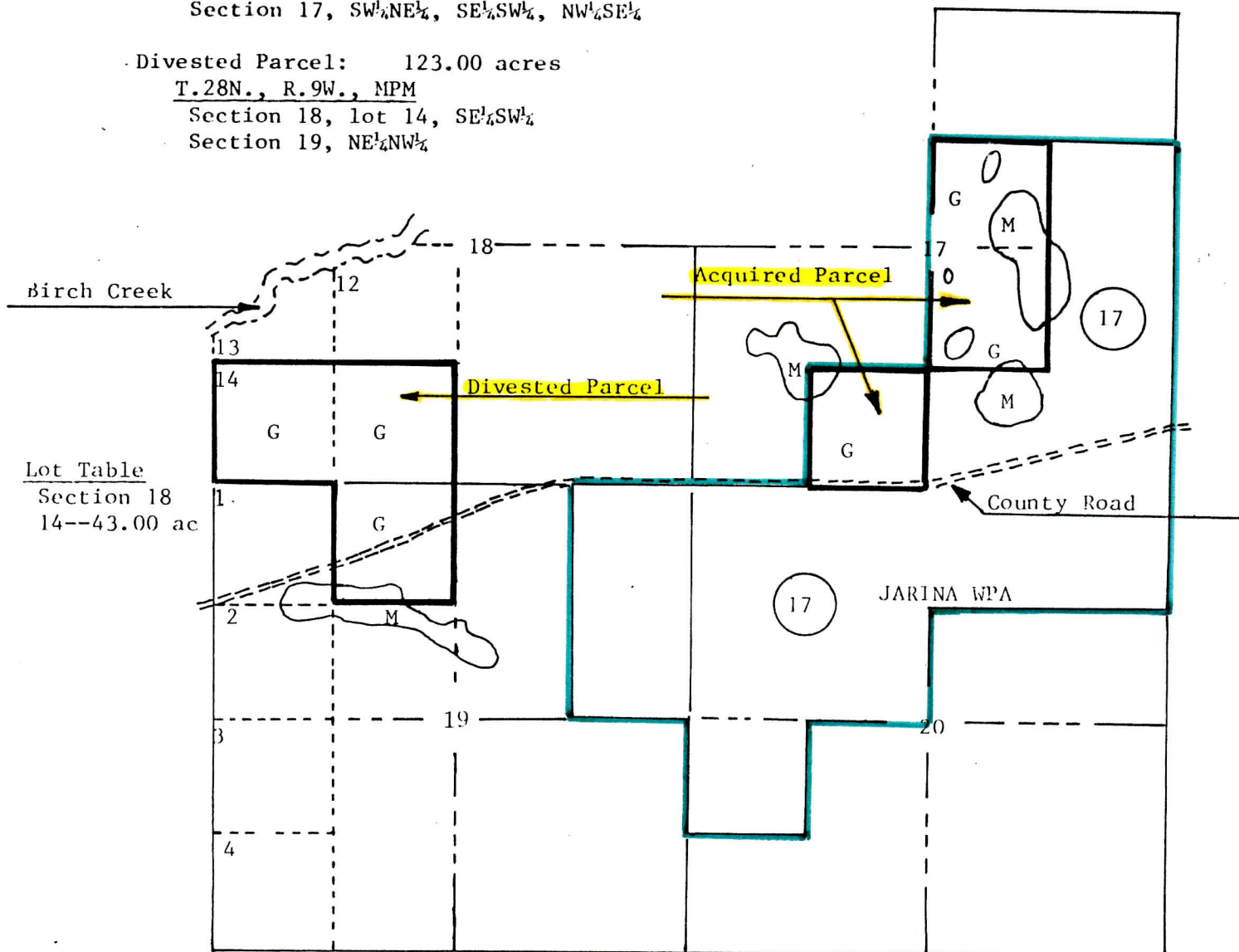
UNIT: Jarina WPA

Pondera COUNTY, Montana

DESCRIPTION:

Acquired Parcel: 120.00 acres
T.28N., R.9W., MPM
Section 17, SW $\frac{1}{4}$ NE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$, NW $\frac{1}{4}$ SE $\frac{1}{4}$

Divested Parcel: 123.00 acres
T.28N., R.9W., MPM
Section 18, lot 14, SE $\frac{1}{4}$ SW $\frac{1}{4}$
Section 19, NE $\frac{1}{4}$ NW $\frac{1}{4}$



Lot Table
Section 18
14--43.00 ac

Base from B.L.M. Plat approved _____ Aerial Photo No. 22-5T-114 Dated 6/30/57

LEGEND

Scale: 3 inches = 1 mile

<div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div>	Agriculture	<div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div>	Swamp
<div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">G</div>	Grass	<div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; text-align: center;">M</div>	Marsh
<div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div>	Hay, wild	<div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div>	Water
<div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div>	Timber		
<div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block;"></div>	Brush		
<div style="border: 1px solid black; width: 20px; height: 10px; display: inline-block; border-radius: 50%;"></div>	Photograph Station		
<div style="border: 2px solid blue; width: 20px; height: 10px; display: inline-block;"></div>	Jarina WPA Boundary		

Examined by RLJ 9/86
Platted by RLJ 9/86
Checked by RLJ 9/86
Exhibit _____



An aerial shot of the McCormick WPA shows the poor wetland conditions of the glaciated pothole habitat in this high mountain valley. The proposed 800 acre roundout would allow us to restore 173 acres of drained wetlands and develop dense nesting cover on the surrounding cropland.

87-14-30

11/02/87

DDL

2. Easements

No new easements were acquired this year. Wetland easements are located in all ten counties of the district. A total of 7,088 wetland acres are protected on 133 tracts (Table II).

TABLE II

EASEMENT ACRES BY COUNTY

<u>County</u>	<u>Easement Tracts</u>	<u>Wetland Acres</u>
Toole	56	2,933
Glacier	44	1,816
Liberty	9	428
Pondera	8	601
Hill	6	407
Cascade	4	78
Powell	2	507
Lewis & Clark	2	247
Teton	1	50
Chouteau	1	21
Totals	133	7,088



Lewis and Clark County 11x-1 was one of the few easements on the district with water this year.
87-19-21 11/24/87 GLS

D. PLANNING

2. Management Plans

Specific management objectives have not been identified for the district. Long term goals correspond to those of the Small Wetlands Program. Short range development plans are developed for each WPA. Manpower and funding have limited our activities to posting, fencing and conversion of cropland to dense nesting cover.

We hope to complete resource inventories of all WPA's in the future. This information will be used to develop a brief management plan for each WPA. These plans should help to provide future direction and continuity of management activities.

ARMM's and Resource Problems funding projects were submitted for the district.

4. Compliance with Environmental and Cultural Resource Mandates

Coordination with the Western Area Power Administration (WAPA) continued on the Great Falls-Conrad 230 KV transmission line. The project involved a line crossing of the Marias River and wetlands in the Shelby area. Manager Pearson met with WAPA and Montana Department of Fish,

Wildlife and Parks personnel to coordinate a bird strike study initiated by Bio West Inc. See Section D,5a of the refuge narrative report for additional details regarding the project and study results.

Comments were also provided on an EIS for a second WAPA transmission line proposed between Conrad and Shelby. We recommended mitigation for waterfowl losses instead of another bird strike study.

5. Research and Investigations

a. Saline Seep Monitoring

Saline seeps are becoming a serious problem in north-central Montana. The contamination of water within the district is due primarily to the fallow cropping system used extensively in this area. In 1981 we began working with the Triangle Conservation District (now called the Montana Salinity Control Association) on two WPA's. A series of shallow cased wells were drilled on the Brumwell and Long Lake WPA's for the purpose of monitoring sub-surface water tables. Test wells are measured twice a year to track changes in ground water levels in response to our revegetation (DNC planting) of recharge areas. Unfortunately, adjacent farming activities continue to recharge "our" saline seeps and we don't seem to be making much progress on reclaiming these areas.

b. Hot Spot Study

In addition to the refuge selenium study, contaminant sampling was expanded to the wetland management district. Nine WPA's were selected for sampling sites based on their potential contamination from saline seeps as well as agricultural runoff. Collections were made in the summer of 1987 by Fish and Wildlife Enhancement (FWE) Biologist George Allen and ARM Sullivan. Sediment and water samples were analyzed for trace elements and pesticides. Five avocets were also collected for contaminant analysis. The general lack of water on the district severely limited sampling opportunities.

Preliminary results indicate no significant problems (yet) on the WMD. One avocet taken from Kingsbury Lake WPA did have elevated selenium levels present in the liver (22 ppm). Elevated selenium levels in this range are known to cause reproductive problems in waterfowl. Further analysis of the data and additional sampling are necessary before making any conclusions. The final report is expected out sometime in 1988. For further

information regarding the contaminant study see Section D,5c of the refuge narrative.



So you call this
a waterfowl
production area,
huh? FWE Biol-
ogist George
Allen collecting
sediment samples
for contaminants
on Kingsbury
Lake WPA.
87-9-22 7/29/87
GLS

E. ADMINISTRATION

1. Personnel

The ten county district is administered by personnel at the Benton Lake NWR and does not receive separate funding. After the busy summer field season at the refuge, ARM Sullivan spent a considerable portion of the fall working on easement enforcement. Next year we plan to hire additional seasonal staff to handle most of the refuge work. This will allow us to place more emphasis on district management activities.

For further information on youth programs, funding and safety, see the refuge narrative report.

7. Technical Assistance

A major new work load was undertaken this year as we began

to increase our emphasis and assistance with the conservation provisions of the 1985 Farm Bill. The Conservation Reserve Program (CRP) was responsible for putting nearly one-half million acres of highly erodible cropland within the district back into permanent cover (Table III). ARM Sullivan began contacting SCS and ASCS offices to discuss the Service's role in the various provisions of the bill. Information was provided to SCS offices on CRP seedings for wildlife habitat and assistance offered in developing conservation plans. We hope to develop a good working relationship with SCS and ASCS offices in the district.

TABLE III

TOTAL ACREAGE ACCEPTED INTO CRP
IN THE BENTON LAKE WMD

County	No. Farms	Acreage
Chouteau	230	104,983.0
Toole	150	71,266.9
Hill	127	58,730.4
Teton	169	58,656.4
Cascade	159	46,151.7
Liberty	101	45,665.4
Glacier	92	38,550.3
Pondera	89	26,718.5
Lewis & Clark	17	5,386.6
Powell	0	0
Totals	1142	456,109.1

On December 16 ARM Sullivan attended a meeting at CMR Refuge to review Service policy and guidance statements regarding the Farm Bill. Montana refuge personnel and the State Fish, Wildlife and Parks Department discussed each agency's role in implementing the conservation provisions of the bill. Discussions centered on funding for wildlife habitat improvement projects on private lands, wetland restoration and FmHA conservation easements. The meeting ended with the "changing of the guard" as Jim Stutzman, Assistant Manager of Bowdoin NWR replaced Gary Wood (Fish, Wildlife and Enhancement) as the new Montana Food Security Act Coordinator.

In conjunction with easement surveillance and travel throughout the district, we documented and reported any possible Swampbuster and Sodbuster violations. Several wetland conversions were found but were not violations of Swampbuster (yet?) until a commodity crop is planted on site. These conversions are well documented and we'll continue to monitor them for future crop production.



Wetland drainage continues to occur in the district. This basin was drained for hay production which is not a violation under Swampbuster until the wetland is planted to a commodity crop.

87-20-05

11/24/87

GLS



We suspected a Sodbuster violation on this easement (Toole Co. 12X-1). It turned out to be a range improvement project using chisel plowing to break up dense stands of club moss caused by overgrazing.

87-17-15

10/29/87

GLS

F. HABITAT MANAGEMENT

2. Wetlands

Wetland conditions continued to deteriorate with almost no spring runoff or substantial rain throughout most of the district. By mid summer only three WPA's (Jarina, McCormick and Sands) had water and most Type IV and V basins were drying up. Easement tracts throughout much of the WMD were dry and farmed through. Without significant precipitation in 1988, the future waterfowl production picture looks dismal.

Two WPA's have water control structures. One on Ehli WPA cannot be used until the necessary private inholding is acquired. The other is located adjacent to the Furnell WPA and is dependent upon the neighbor's willingness to divert water toward the unit. In May ARM's Linehan and Sullivan inspected the water delivery system. We hope to explore our options to upgrade the existing delivery ditch. We will continue to negotiate the fair delivery of water with the adjacent landowner.



Assistant Manager Sullivan inspecting the water control structure adjacent to the Furnell WPA. No water was available for diversion this year due to poor winter snow pack in the Sweetgrass Hills.

87-3-28

05/27/87

DDL

4. Croplands

The cooperative farming program was phased out this year with the last farming permit being issued for 28 acres (spring barley) on the Brown WPA. Cropland on the Toole County WPA's has been used to alleviate crop depredations in the area. With waterfowl numbers on the decline and such extensive small grain farming in this area, we felt that the lure crop acreage would be more beneficial to waterfowl if planted to dense nesting cover (DNC).

A total of 70 acres of cropland was seeded back to DNC in 1987. Two fields on the Danbrook WPA totalling 33 acres were planted on May 10th to our standard DNC mix (tall wheatgrass, intermediate wheatgrass, alfalfa and sweetclover). The dry spring conditions didn't help and we may have to reseed next year. A 37 acre field on the Brown WPA was seeded on June 7th. This was a very late seeding but fortunately we had good moisture in late June and July and got an excellent catch. Since 1978 we have converted 2,028 acres of cropland in the district to DNC.

A total of 28 acres of barley was harvested by cooperator Mike Lerum on the Brown WPA. This was the last remaining cropland on the district and the field is scheduled to be planted to DNC next year. We took our share of this year's crop in small square bales. Approximately 400 bales were placed in five winter food plots on Ehli (1), Danbrook (1), Long Lake (1) and Brown (2) WPA's. Bales on Ehli and Brown WPA's received good use while those on Long Lake were eaten by trespass cattle.

5. Grasslands

The 19 WPA's currently contain 4366 acres of native short grass prairie. Initial management of newly acquired WPA's includes resting these areas from grazing, and fencing the boundaries to exclude trespass cattle from the units. Grasslands are monitored and treatments prescribed when plant vigor begins to decline. No grazing, haying or prescribed fire was used in the district in 1987.

10. Pest Control

We are fortunate to have few problems with noxious weeds on the WMD. The majority of our WPA's have good competitive stands of cover which seem to prevent the invasion of most weeds. No chemicals were used this year and we hope to continue this pattern.

The drought conditions contributed to a bumper crop of grasshoppers in 1987. We received a complaint from the Teton County Commissioners regarding grasshoppers on the Savik WPA. ARM Sullivan met with the adjacent landowner,

"Toad" Gephart, to look at the problem. Grasshoppers were abundant on and off the WPA. We decided to try some biological control using Nolo Bait. This biological insecticide consists of a one-celled protozoan, Nosema locustae, which is formulated on dry wheat bran to make a bait that's attractive to grasshoppers. Approximately 50 acres of the WPA were treated using an ATV mounted broadcast spreader. Nosema locustae is an infectious protozoan which spreads from generation to generation and should provide some long term control. Preliminary results were promising and encouraged the adjacent landowner to treat 150 acres of his land with Nolo Bait. We not only helped to control grasshopper problems in this area, but also influenced the amount of chemicals (Sevin and Pydrin) being applied to the environment.



A new ATV mounted broadcast spreader was used to treat 50 acres of the Savik WPA with Nolo Bait, a biological insecticide used to control grasshoppers
87-8-9 6/24/87 GLS

11. Water Rights

In 1986 Mr. Gordon Sands offered to transfer to the Service his annual 50 acre feet water use contract on the Lower Beaver Creek Reservoir for diversion into the Sands WPA.

A flowage easement was obtained from the Hill County Airport and work initiated to develop a water delivery system. ARM Sullivan met with Don Anderson, Foreman of the Montana Agricultural Experiment Station, concerning a cooperative effort to supply water to the WPA. After a field inspection, he agreed to let us use their existing takeout structure and delivery ditch reducing our costs to the installation of one culvert, a ditch check and a parshall flume. The work is scheduled to be completed next year.

13. WPA Easement Monitoring

Wetland easement surveillance flights were flown on April 1, October 30 and November 2. The fall flights resulted in 18 possible violations needing ground checking. At the end of the year eight violations were confirmed. Five cases were closed, with an additional three pending (Table IV).

TABLE IV

1987 EASEMENT VIOLATIONS

<u>Easement Tract</u>	<u>Type Violation</u>	<u>Disposition</u>
Glacier Co. 16X	Drainage	Wetland restored
*Glacier Co. 28X	Drainage	Wetland restored and \$100 NOV paid
Glacier Co. 13X-1	Drainage	Pending
Glacier Co. 11X	Fill	Pending
Glacier Co. 42X-1	Fill	Pending
Cascade Co. 15X	Burning	Warning letter issued
Hill Co. 15X	Burning	Warning letter issued
Hill Co. 16X	Burning	Warning letter issued

 *First NOV ever written for easement violation on Benton Lake WMD



Drainage violation on Glacier County 28X. The basin was restored and a \$100 NOV issued, the first ever written for an easement violation in the district.

87-16-01

10/31/87

GLS

In an effort to increase our emphasis on easement enforcement, we began ground checking all easements on a county by county basis. These routine checks resulted in detecting several violations which have been missed from the air. All basins on each tract are photographed and documented to provide base line data for future enforcement work. All easements within Lewis and Clark, Hill, Cascade, Chouteau and Teton Counties were ground checked and photographed in 1987. Next year we plan to finish the other five counties, update all easement records and develop a computerized tracking system to monitor changes in ownership.

Sp S F W

FINCHES

___ Rosy Finch		r	r
___ Red Crossbill		r	
___ Common Redpoll	o		o u
___ House Finch	o		o
___ Pine Siskin		r	
___ American Goldfinch	o	r	o u

WEAVER FINCHES

___ • House Sparrow	o	o	o
---------------------------	---	---	---

ACCIDENTALS

Mute Swan	Curlew Sandpiper
Black Scoter	Parasitic Jaeger
Surf Scoter	Long-tailed Jaeger
Garganey	White-winged Dove
Green-backed Heron	American Dipper
Great Egret	Cattle Egret

Your bird and other wildlife sightings are an important part of monitoring wildlife use on Benton Lake National Wildlife Refuge. Please share your uncommon, occasional or rare bird sightings with the refuge staff.

For more information contact:

Refuge Manager
Benton Lake National Wildlife Refuge
P.O. Box 450
Black Eagle, Montana 59414
(406) 727-7400

DATE _____ TIME _____

OBSERVER(S) _____

WEATHER _____

NOTES



UNITED STATES
DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE



RF-61510-2

Printed August 1993



All wetlands covered under easement are being ground checked and photographed to provide us with documentation for future easement enforcement work. This basin is perched up high on a bench and would be an easy one to drain.

87-18-37

10/23/87

DDL



Rock piles on easements are being photographed during ground checks to monitor future expansion into the wetland.

87-20-21

11/25/87

GLS

G. WILDLIFE

Specific survey data on wildlife populations within the district is minimal due to its size and our limited staff. Surveys are usually accomplished incidental to district work projects.

1. Wildlife Diversity

The district contains at least three distinct habitat types. Most of the WPA's are located in the short grass prairie of the northern Great Plains. The Sweetgrass Hills along the Canadian border include the high elevation glaciated prairie (Furnell WPA). The high intermountain glaciated wetlands and riparian habitat is represented by the McCormick WPA in the Ovando Valley near Helmville, MT.



This farmer had a bumper crop of rock this year. During a ground check of this easement (Glacier Co. 24X-5) we ran across a new species for the district . . .

87-20-28

11/25/87

GLS



A closer look revealed a herd of bison, probably wondering what happened to their native grassland.

87-20-26

11/25/87

GLS

2. Endangered and Threatened Species

Sightings of bald eagles, American peregrine falcons, prairie falcons, Richardson's merlins and ferruginous hawks have been made in the district. Only the ferruginous hawk has been documented as nesting on our WPA's (Kingsbury Lake). A bald eagle nest is located approximately 2 miles south of the McCormick WPA.

3. Waterfowl

The drought continues to take its toll on waterfowl populations in the district. A partial breeding pair count along with general observations formed the basis of guesstimating waterfowl production on our WPA's at 231 ducks and 32 geese. This is the lowest production estimate since the initiation of estimates in 1978.

In an effort to get more reliable data on waterfowl production and nesting success in the district, we tried some limited nest dragging this year. Approximately 40 acres on the Furnell WPA were dragged using ATV's. A single mallard nest was found in a patch of western snowberry. It was later checked and found to be successful. We had hoped to collect enough data to document the apparent predation problem on portions of the district. We were told by the

R.O. that we had to have nest dragging data before proposing any predator control activities on the WMD. We don't plan to spend a lot of time nest dragging on WPA's until this drought cycle breaks.



Assistant Manager Linehan candling an egg of the only nest found during nest dragging on the Furnell WPA. The hen mallard was successful with her nesting effort in this patch of western snowberry.

87-4-21

05/27/87

GLS

To better assess predator rates on portions of the district with water, a dummy nest study was initiated on Furnell and Jarina WPA's. Although the validity of this data has been criticized, it is a simple and quick method for estimating predation rates. Transects with 100 dummy nests (chicken eggs) were placed through suitable nesting cover on both WPA's.

A single chicken egg is placed in cover comparable to that of a natural duck nest. Nests are rechecked after 35 days of exposure. On the Jarina WPA 96% of the nests were destroyed by predators. Most of the predation was attributed to corvids whose populations are very high in this area. There certainly are study design problems with this technique but we feel it does provide an index to predation rates which can be used to compare annual fluctuations in levels of predation.



Assistant Manager Sullivan places a dummy nest egg on the Jarina WPA. Results of the study indicated high predation rates (96%) on the unit.
 87-7-7 05/28/87 DDL

We will continue to evaluate the need for a predator control plan on the WMD. We've been told that dummy nest results are not a valid indicator of a predator problem. So once again, we are faced with spending considerable time and effort nest dragging hundreds of acres to prove that predators eat duck eggs. We question whether it's worth nest dragging large areas on such a big district and how would we implement a predator control program. Our first attempt at nest dragging this year produced only one nest. Could poor recruitment from years of high predation be responsible for such low nesting densities? Based on our observations of predator populations in the WMD, we tend to think so. The solution isn't easy but identifying the problem is - drought coupled with high predation is seriously impacting waterfowl populations.

4. Marsh and Water Birds

Due to drought and lack of wetland habitat, use by these species was extremely limited. Horned grebes were sighted on Furnell and McCormick WPA's. The pied-billed, horned, western, eared and red-necked grebes have all been known to nest in the district. Sandhill cranes have been observed nesting on both Savik and McCormick WPA's. A single crane was spotted on the Savik WPA on August 17th. Four cranes were also spotted feeding east of the Jarina WPA on June 14.

5. Shorebirds, Gulls, Terns and Allied Species

Population estimates and use are unknown for 1987 but lack of wetland habitat surely affected the degree of use on the WMD. Small colonies of Franklin gulls and black terns have been known to nest on Schrammeck Lake and McCormick WPA's in past years. Long-billed curlews and marbled godwits were observed nesting on the Savik WPA this year.

6. Raptors

Raptors which are regularly seen throughout the district include the golden eagle, Swainson's hawk, American kestrel, marsh hawk and great horned owl. Raptors known to nest on several WPA's are the red-tailed hawk, short-eared owl and marsh hawk. A brood of four short-eared owls was found on Kingsbury Lake WPA in July. Additional raptors are mentioned in the Endangered and Threatened Species section.

8. Game Mammals

Mule and white-tail deer populations continue to do well throughout most of the district. Mule deer were seen regularly on several WPA's. White-tails thrive in WPA DNC fields and in the riparian habitat along the Blackfoot River which snakes its way through the McCormick WPA. Use by the pronghorn antelope population continues to increase on the Furnell WPA. Elk migrate through and winter on both the Furnell and McCormick WPA's. Four elk were spotted on June 4th just south of the Furnell unit. Hunting is allowed in accordance with state regulations on all our WPA's except the Sands WPA, where hunting and trapping are not allowed as part of the deed stipulations.

10. Other Resident Wildlife

Sharp-tailed grouse, Hungarian (gray) partridge and ring-necked pheasants are found throughout the district. With such extensive farming in the WMD, our WPA's provide some of the best (and only) cover for upland game birds in the area. Sharp-tail grouse leks were found on Jarina, Brown and Long Lake WPA's this year. Hungarian partridge numbers were up significantly in 1987 throughout much of Montana. Pheasants have become established on the Danbrook WPA from bird releases in nearby Canada. Coyotes, red fox, raccoon, badger, striped skunks, mink, weasel and rattlesnakes are also found on the district.



Nongame species also benefit from our excellent stands of cover on the WPA's. A white-crowned sparrow chose this spot to nest on the Jarina WPA.

87-7-1

05/29/87

GLS



Assistant Manager Sullivan was greeted by this visitor on the Kingsbury Lake WPA. This prairie rattlesnake had crawled under the tailgate for a little shade and a big surprise for the driver.

87-10-30

07/28/87

GLS

H. PUBLIC USE

1. General

Monitoring public use on the district is very difficult. Most of the information we receive is reported directly to our office or is obtained by talking to adjacent landowners. Few people are familiar with the location of our isolated WPA's resulting in mainly "locals" using these areas. Other than two parking areas (Sands and Shrammeck Lake WPA's) we have no developed public use facilities on the WMD.

8. Hunting

Upland game, waterfowl and big game hunting are allowed on all the WPA's except the Sands WPA. Monitoring the degree of hunting pressure and success is very difficult due to the size of the district. Much of this information is unknown but occasionally we receive reports from adjacent landowners. With the addition of a second assistant manager, we plan to expand our law enforcement efforts out on the district next year.

9. Fishing

McCormick WPA is the only WPA with a fishery resource. Fishing on the Blackfoot River, which winds through the south end of the WPA, is locally popular in the Ovando Valley.

The Furnell WPA had a fish pond which was stocked at one time but a string of drought years has left it almost dry.

10. Trapping

Information on trapping in the district is minimal. Trapping of muskrats, raccoon and coyote occurs on several WPA's.

15. Off-Road Vehicling

Off-road vehicle trespass surfaced as a major problem on the Furnell WPA this year. Gas well access roads and a private driveway on the WPA create the opportunity for this type of illegal activity. We believe most of this occurs during the big game season and plan to work this area next year. Vehicle trespass also occurred on Long Lake and Danbrook WPA's this year. Signing and construction of several parking areas is planned in 1988.



Off road vehicle trespass continues to be a problem on the Furnell WPA. Additional signing and vehicle barriers are planned for next year.

87-19-6

11/25/87

GLS

17. Law Enforcement

Other than easement work, no active law enforcement was performed on the district this year. We do plan to make our presence known next year during the hunting season.

Trespass cattle continue to be a problem on both the Furnell and McCormick WPA's. Adjacent landowners know we're located over 100 miles away and frequently take advantage of "all the government grass going to waste". Catching them in the act is difficult but hopefully our increased presence in the district will deter them. If it doesn't, an NOV and \$7.50/AUM might.



Trespass grazing continues to be a problem on the McCormick WPA. Here cattle were spotted along the Blackfoot River during an easement surveillance flight.
 87-14-17 11/02/87 DDL



This carcass pit was found while checking a drainage violation on Glacier Co. 13X-1. Warbex (containers in center of photo), an insecticide, was being poured on carcasses posing a threat of poisoning to eagles and other wildlife in the area.
 87-18-8 12/03/87 DDL

J. OTHER ITEMS

1. Cooperative Programs

Assistance was provided to the Montana Department of Natural Resources and the Department of Fish, Wildlife and Parks in monitoring and evaluating waterfowl use along the WAPA power line crossing the Marias River. See Section D,2 for additional information regarding this subject.

3. Items of Interest

Revenue sharing checks for Fiscal Year 1986 were received in April. This year's payment dropped to 60.1% of entitlement. If this trend continues, it may create opposition to future acquisition in the WMD. Revenue sharing checks were delivered to County Commissioners in all counties except Glacier and Powell. So far we continue to receive positive support from the Commissioners for the Small Wetlands Program in the district. personally

4. Credits

This report was written by Sullivan, edited by Linehan and Pearson and typed by Benway.